

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND RSS 247 REQUIREMENT OF

	0F
Applicant:	TomTom International B.V.
	De Ruijterkade 154, 1011 AC Amsterdam, 1011 AC, The Netherlands
Product Name:	GPS Navigation System
Brand Name:	TomTom
Model No.:	4BA63
Model Difference:	N/A
FCC ID:	S4L4BA63
IC:	5767A-4BA63
Report Number:	E2/2018/10088
FCC Rule Part:	§15.247, Cat: DTS
IC Rule Part:	RSS-247 issue 2 Feb 2017
Issue Date:	Feb. 23, 2018
Date of Test:	Jan. 15, 2018 ~ Feb. 09, 2018
Date of EUT Received:	Jan. 15, 2018

We hereby certify that:

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

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

Prepared By:

karen Huan Karen Huang / Clerk

Approved By:

Jim Chang / Manager



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Revision History

Report Number	Revision	Description	Issue Date
E2/2018/10088	Rev.00	Initial creation of document	Feb. 23, 2018

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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	GPS Navigation System		
Brand Name:	TomTom		
Model No.:	4BA63		
Model Difference:	N/A		
Product SW/HW Version:	18.100.0010 / MP		
Radio SW/HW Version:	N/A / N/A		
Test SW Version:	N/A		
RF power setting in TEST SW:	N/A		
Power Supply:	3.7Vdc from Rechargeable Li-ion Battery		
Power Supply:	Battery:	Model No.: AT6, Supplier: TomTom	

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Type of Emission 99%	Modulation Technology		
11b/g	2412-2462	11	b: 16.29dBm g: 20.37dBm	b:12M8G1D g:17M3D1D	DSSS, OFDM		
11n	HT20 2412-2462	11	HT20:19.19dBm	HT20:18M2D1D	OFDM		
Antenna Designation:		Monopole Antenna, Peak Gain: 2.5dBi					
Modulation type: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OF			FDM				
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					

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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 Canada RSS-247 issue 2 Feb. 2017 Canada RSS-Gen issue 4 Nov. 2014 ANSI C63.10:2013

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

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers and Designation number are: 735305 / TW0002

Canada Registration Number: 4620A-5

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION 2

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 **Conducted Emissions**

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

Radiated Emissions 2.3.2

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 and attenuator. offset = RF cable loss + attenuation factor=10.6dB

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration



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



Fig.2-3 AC Power Line Conducted Emission Configuration

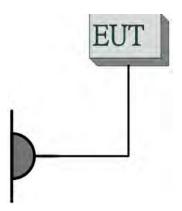


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	X420	PF-00UH6D	Shielded	Unshielded

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SUMMARY OF TEST RESULTS 3

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b)(3)	RSS-247 §5.4(d)	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.2 (a) RSS-Gen §6.6	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	RSS-247 §5.5	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	RSS-247 §5.2(b)	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		

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.

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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			

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 H 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		

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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 2.The limit decreases linearly wit MHz.	e transition frequencies h the logarithm of the frequency ir	n the range 0.15 MHz to 0.50				

6.2 Measurement Equipment Used

	Conducted Emission Test Site									
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.					
EMI Test Receiver	R&S	ESCI 7	100950	12/24/2017	12/23/2018					
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	08/30/2017	08/29/2018					
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2017	06/17/2018					
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.					

6.3 EUT Setup

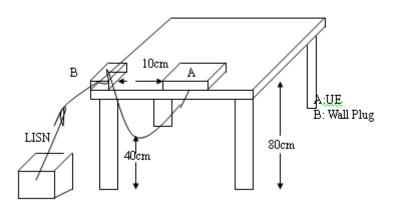
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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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

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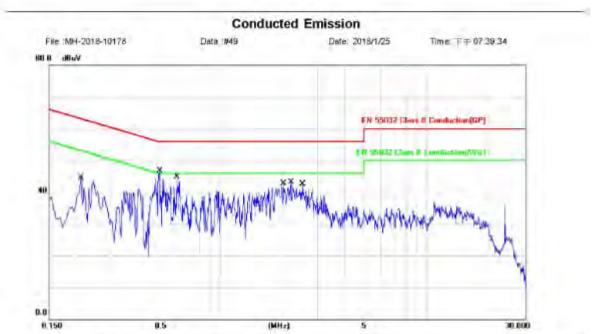
6.6 Measurement Result

No	de: Mo	0de_12	lass B Cor	nduction(Q	Ρ)	Powe		2017/60142		Humidity: 63 %.
	_				Cond	lucted	Emissi	on		
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0.	0.150	6	Reading	Correct			Over	5 Detector	Comment	30.000
1	0.150	Freq	Reading Level	Correct Factor	ment	Limit			Comment	30,000
	0.150	Freq MHz	Reading Level dBuV	Correct Factor dB	ment. dBuy	Limit dBuV	dE	Detector	Comment	30.00
1	0.151 Mk	Freq MHz 0.2380	Reading Level dBuV 39.54	Correct Factor dB 0.03	ment. dBuV 39.57	Limit dBuV 62.17	dE -22,60	Detector	Comment	30.00
1 2	0.151 Mk	Freq MHz 0.2380 0.2380	Reading Level dBuV 39.54 32.96	Correct Factor dB 0.03 0.03	ment. dBuV 39.57 32.99	Limit dBuV 62,17 52,17	dE -22,60 -19,18	Detector QP AVG	Comment	30.000
1 2 3	0.151 Mk	Freq MHz 0.2380 0.2380 0.5340	Reading Level dBi/V 39.54 32.96 44.87	Correct Factor dB 0.03 0.03 0.05	ment. dBvV 39.57 32.99 44.92	Limit dBuV 62.17 52.17 56.00	dE -22,60 -19,18 -11,08	Detector QP AVG QP	Comment	30.00
1 2 3 4	0.151 Mk	Freq MHz 0.2380 0.2380 0.5340 0.5340	Reading Level dBi// 39.54 32.96 44.87 33.08	Correct Factor dB 0.03 0.03 0.05 0.05	ment dBuV 39.57 32.99 44.92 33.13	Limit dBuV 62.17 52.17 56.00 46.00	dE -22,60 -19,18 -11,08 -12,87	Detector QP AVG QP AVG	Comment	30.00
1 2 3 4 5	n Tsa Mk	Freq MHz 0.2380 0.2380 0.5340 0.5340 0.5820	Reading Level dBiV 39.54 32.96 44.87 33.08 35.42	Correct Factor dB 0.03 0.03 0.05 0.05 0.05	ment. dBuV 39.57 32.99 44.92 33.13 38.47	Limit dBuV 62.17 52.17 56.00 46.00 56.00	dE -22,60 -19,18 -11,08 -12,87 -17,53	Detector QP AVG QP AVG AVG QP	Comment	30.000
1 2 3 4 5 6	n Tsa Mk	Freq MHz 0.2380 0.2380 0.5340 0.5340 0.5340 0.5820 0.5820	Reading Level 39,54 32,96 44,87 33,08 35,42 27,65	Correct Factor dB 0.03 0.03 0.05 0.05 0.05 0.05	ment. dBuV 39.57 32.99 44.92 33.13 38.47 27.70	Limit dBuV 62,17 52,17 56,00 46,00 56,00 46,00	dE -22.60 -19.18 -11.08 -12.87 -17.53 -18.30	Detector QP AVG QP AVG AVG	Comment	30.00
1 2 3 4 5 6 7	0.150 Mk	Freq MHz 0.2380 0.2380 0.5340 0.5340 0.5820 0.5820 0.8900	Reading Level dBi// 39.54 32.96 44.87 33.08 35.42 27.65 38.38	Correct Factor dB 0.03 0.03 0.05 0.05 0.05 0.05 0.05	ment. dBuV 39.57 32.99 44.92 33.13 38.47 27.70 38.44	Limit dBuV 62.17 52.17 56.00 46.00 56.00 46.00 56.00	dE -22.60 -19.78 -11.08 -12.87 -17.53 -18.30 -17.56	Detector QP AVG QP AVG QP AVG QP	Comment	30,000
1 2 3 4 5 6 7 8	0.154	Freq MHz 0.2380 0.5340 0.5340 0.5820 0.5820 0.6820 0.8900 0.8900	Reading Level dBi// 39.54 32.96 44.87 33.08 35.42 27.65 38.38 33.09	Correct Factor dB 0.03 0.03 0.05 0.05 0.05 0.05 0.05 0.06 0.06	ment. dBuV 39.57 32.99 44.92 33.13 38.47 27.70 38.44 33.15	Limit dBuV 62.17 52.17 56.00 46.00 56.00 46.00 56.00 46.00	dE -22,60 -19,18 -11,08 -12,87 -17,53 -18,30 -17,56 -12,85	Detector QP AVG QP AVG QP AVG QP AVG	Comment	30.000
1 2 3 4 5 6 7 8 9	0.154	Freq MHz 0.2380 0.2380 0.5340 0.5340 0.5820 0.5820 0.5820 0.6900 0.8900 0.9900	Reading Level dBi// 39.54 32.96 44.87 33.08 35.42 27.65 38.36 33.09 33.09 39.41	Correct Factor dB 0.03 0.05 0.05 0.05 0.05 0.05 0.06 0.06 0.07	ment. dBuV 39.57 32.99 44.92 33.13 38.47 27.70 38.44 33.15 39.48	Limit dBuV 62.17 52.17 56.00 46.00 56.00 46.00 56.00 46.00 56.00	dE -22,60 -19,78 -11,08 -12,87 -17,53 -17,53 -17,56 -12,85 -16,52	Detector QP AVG QP AVG QP AVG QP AVG QP AVG	Comment	30.00

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Tempetature: 19 E Site . Conduction Room Phase. N Humidity AC 120V/60Hz 63 % Limit EN 55032 Class B Conduction(QP) Power. Mode: Mode 12 Note



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz:	dBuW	dB	dBuW	dBuV	dB	Detector	Comment	
1		0.2140	38.60	0.11	38.71	63 05	-24.34	QP		
2		0.2140	30.94	.0.11	31.05	53 05	-22 00	AVG		
З	•	0.5140	44.76	0.12	44 88	56.00	-11.12	QP		
4		0.5140	27.59	0.12	27.71	46.00	-18 29	AVG		
.5	-	0.6260	39.65	0.12	39.77	58.00	-16 23	QP		
6	1	0.6260	30.26	0.12	30.38	46.00	-15.62	AVG		
7		2.0500	37.32	0.25	37 57	56.00	-18.43	QP		
а		2 0500	30 69	0.25	30 94	46 00	-15.06	AVG		
9		2.2140	39.06	0.25	39.31	56.00	-16.69	QP		
10		2.2140	33.39	0.25	33.64	46.00	-12 36	AVG		
11		2 5180	35 23	0.26	35.49	56.00	-20.51	QP		
12	-	2.5180	28.38	0.26	28,64	46.00	-17.36	AVG		

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7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

Duty Cycle:

	Duty Cycle (%)	Offset	Duty Factor (dB)	1/T (kHz)	VBW setting (kHz)
802.11b	97.74	8.41	0.10	0.12	1.00
802.11g	87.27	1.56	0.59	0.64	1.00
802.11n_20	86.58	1.47	0.63	0.68	1.00

Duty Cycle Factor: $10 * \log(1/0.9774) = 0.1$ Duty Cycle Factor: 10 * log(1/0.8727) = 0.59 Duty Cycle Factor: $10 * \log(1/0.8658) = 0.63$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result 802.11 b

R R R	Ann Analyzer - Skept SA Al Sa G DC	STIRST SWIT	NJON NITO		
11.84	g 2.437000000 GHz		Avg Type: Log-Pwr	04:11:46 PM Jan 29, 2018 TRACE 1 2 3 4 5 1	Frequency
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10 dB/div	Ref Offset 10.6 dB Ref 20.00 dBm		Δ	Mkr3 8.406 ms 0.07 dB	Auto Tune
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000					Start Freq 2.437000000 GHz
400 500 600 700					Stop Freq 2.437000000 GHz
Center 2.43 Res BW 8 M		VBW 8.0 MHz		Span 0 Hz 1.07 ms (1001 pts)	CF Step 8.000000 MHz Auto Man
2 F 1 t	(A) 8.216 ms	9.16 dBm	TION FUNCTION MOTH	FUNCTION VALUE	Freq Offset 0 Hz
		-			

802.11 g



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802.11 n_20 MHz

mi-House - Strapt S									
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	1.083 ms 1.475 ms	(4)	10.76 dBm -0.73 dB		FUNC	IDM WOTH	Fancino	NULUE .	Freq Offse 0 H
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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.

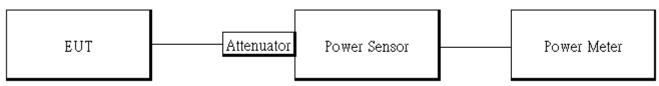
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

8.2 Measurement Equipment Used

	Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018					
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018					
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018					
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018					
Coaxial Cable 30cm	WOKEN	00100A1F1A195 C	RF01	12/24/2017	12/23/2018					
DC Block	PASTERNACK	PE8210	RF29	12/24/2017	12/23/2018					
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/24/2017	12/23/2018					
Attenuator	WOKEN	218FS-10	RF23	12/24/2017	12/23/2018					
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018					

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.
- 3. 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

802.1	1b Main						
сн	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		RESULT		
1	2412	1	15.78	1 Watt =	30.00	dBm	PASS
6	2437	1	16.29	1 Watt =	30.00	dBm	PASS
11	2462	1	16.22	1 Watt =	30.00	dBm	PASS
802.1	1b Main						
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		Limit		RESULT
1	2412	1	12.81	1 Watt =	30.00	dBm	PASS
6	2437	1	13.35	1 Watt =	30.00	dBm	PASS
11	2462	1	13.28	1 Watt =	30.00	dBm	PASS

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802.1	1g Main						
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)		RESULT		
1	2412	6	20.11	1 Watt =	30.00	dBm	PASS
6	2437	6	20.37	1 Watt =	30.00	dBm	PASS
11	2462	6	20.32	1 Watt =	30.00	dBm	PASS
802.1	1g Main						
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		Limit		RESULT
1	2412	6	9.90	1 Watt =	30.00	dBm	PASS
6	2437	6	10.23	1 Watt =	30.00	dBm	PASS
11	2462	6	10.21	1 Watt =	30.00	dBm	PASS

802.1	802.11n_HT20M Main							
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESULT			RESULT	
1	2412	MCS0	18.64	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	19.04	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	19.19	1 Watt =	30.00	dBm	PASS	
802.1	802.11n_HT20M Main							
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		Limit		RESULT	
1	2412	MCS0	8.30	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	8.70	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	8.92	1 Watt =	30.00	dBm	PASS	

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

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802.1 ⁻	802.11b Main								
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	1	12.81	2.50	15.31	4W=	36	dBm	PASS
6	2437	1	13.35	2.50	15.85	4W=	36	dBm	PASS
11	2462	1	13.28	2.50	15.78	4W=	36	dBm	PASS
802.1 ⁻	1g Main								
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	6	9.90	2.50	12.40	4W=	36	dBm	PASS
6	2437	6	10.23	2.50	12.73	4W=	36	dBm	PASS
11	2462	6	10.21	2.50	12.71	4W=	36	dBm	PASS
802.1 ⁻	1n_HT20N	/ Main							
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	MCS0	8.30	2.50	10.80	4W=	36	dBm	PASS
6	2437	MCS0	8.70	2.50	11.20	4W=	36	dBm	PASS
11	2462	MCS0	8.92	2.50	11.42	4W=	36	dBm	PASS

* Note: EIRP = Average Power + Gain

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

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9 6dB & 99% BANDWIDTH MEASUREMENT

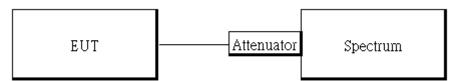
9.1 Standard Applicable

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.		
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018	
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018	
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018	
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018	
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/24/2017	12/23/2018	
DC Block	PASTERNACK	PE8210	RF29	12/24/2017	12/23/2018	
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/24/2017	12/23/2018	
Attenuator	WOKEN	218FS-10	RF23	12/24/2017	12/23/2018	
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018	

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

802 11h Main

Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result	
(MHz)	(kHz)	(kHz)	nesuit	(MHz)	(kHz)	(kHz)	nesuit	
2412	8100	> 500	PASS	2412	16460	> 500	PASS	
2437	8100	> 500	PASS	2437	16460	> 500	PASS	
2462	8100	> 500	PASS	2462	16440	> 500	PASS	

802 11a Main

802.11 n HT20 Main

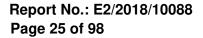
Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17630	> 500	PASS
2437	17620	> 500	PASS
2462	17630	> 500	PASS

802.11b Ma	in	802.11g Main		
Freq. 99% BW (MHz) (MHz)		Freq. (MHz)	99% BW (MHz)	
2412	12.781	2412	17.285	
2437	12.784	2437	17.295	
2462	12.789	2462	17.261	

802.11n HT20M Main

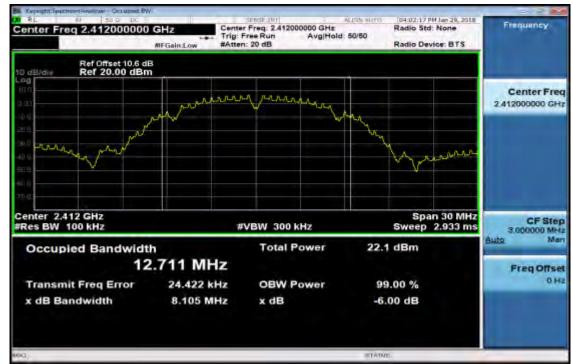
	Freq. (MHz)	99% BW (MHz)
	2412	18.153
	2437	18.191
	2462	18.158

*Refer to next page for plots





802.11b **CH-Low**



CH-Mid



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CH-High



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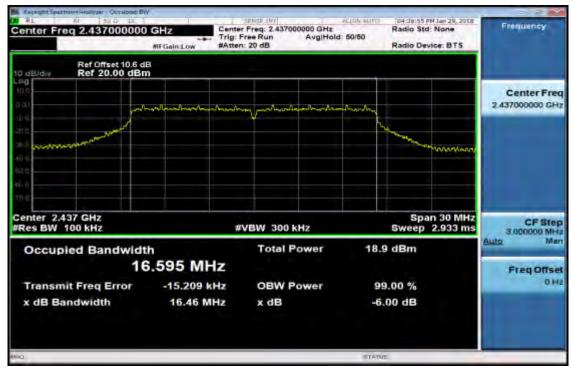
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802.11g **CH-Low**

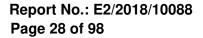


CH-Mid



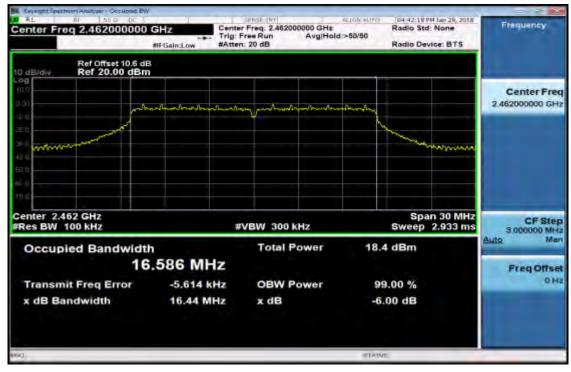
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CH-High



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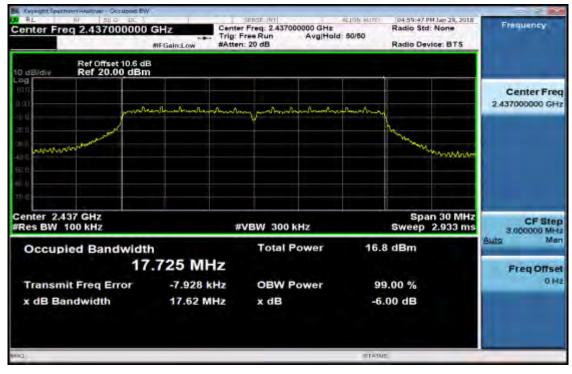
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802.11n HT20M **CH-Low**

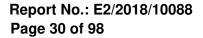


CH-Mid



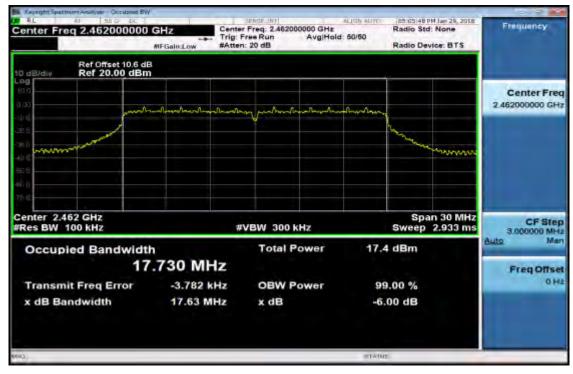
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CH-High



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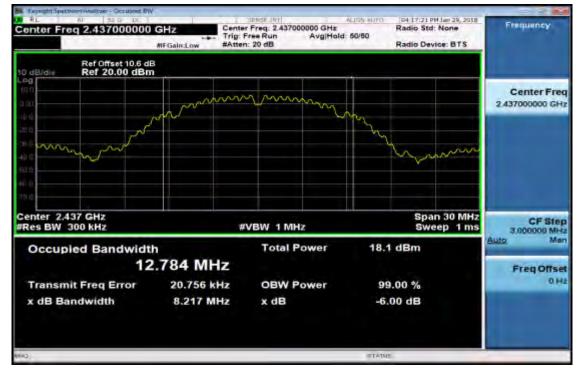
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802.11b 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

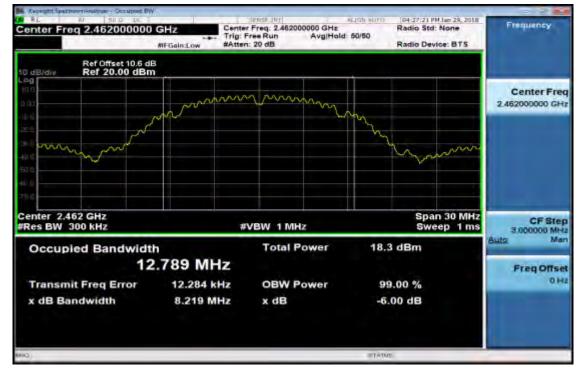


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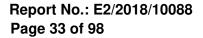


99% Band Width Test Data CH-High



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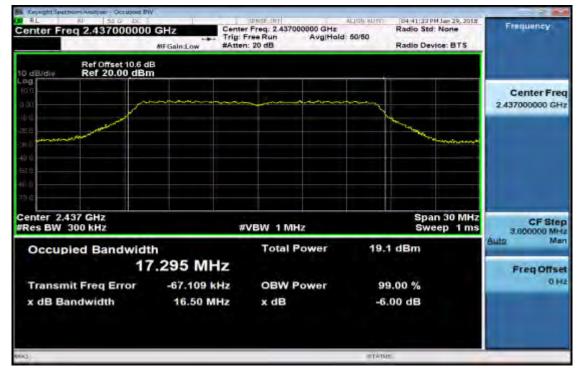




802.11a 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

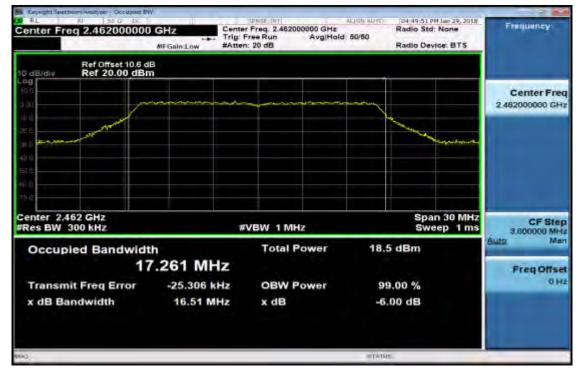


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99% Band Width Test Data CH-High



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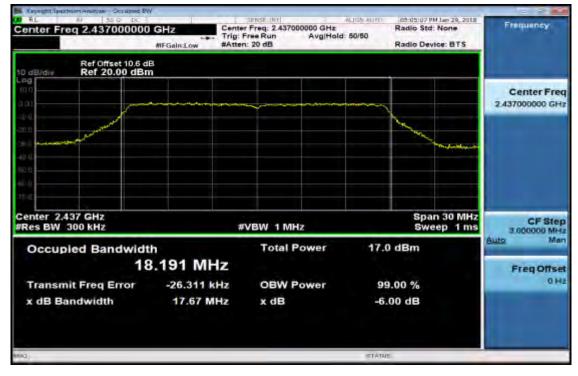
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802.11n 20M 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

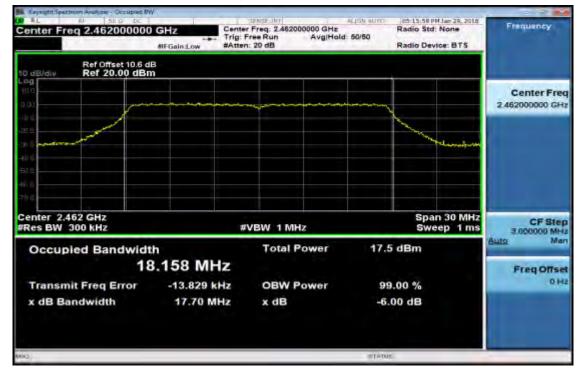


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99% Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

As per KDB 558074 D01 11.1 a)

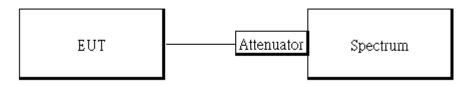
If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

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) & RSS-Gen §8.10 Table 6, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9 Table4 &5.

	Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018						
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018						
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018						
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018						
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/24/2017	12/23/2018						
DC Block	PASTERNACK	PE8210	RF29	12/24/2017	12/23/2018						
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/24/2017	12/23/2018						
Attenuator	WOKEN	218FS-10	RF23	12/24/2017	12/23/2018						
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018						
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018						

10.2 Measurement Equipment Used

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.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.

Conducted Band Edge:

- 1. 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.
- 9. 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.
- 3. 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**

Refere	nce Leve	of Limit 802.11b mode	Referen	nce Leve	of Limit 802.11g mode
Freq.	PSD	Reference Level of Limit	Freq.	PSD	Reference Level of Limit
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)
2412	6.29	-13.71	2412	0.28	-19.72
2462	6.39	-13.61	2462	-0.36	-20.36

Reference Level of Limit 802.11n20 mode

Freq.	PSD	Reference Level of Limit
(MHz)	(dBm)	(dBm)
2412	-1.82	-21.82
2462	-1.40	-21.40

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802.11b PSD FOR BANDEDGE LIMIT (CH-Low)



802.11b PSD FOR BANDEDGE LIMIT (CH-High)



802.11g PSD FOR BANDEDGE LIMIT (CH-Low)

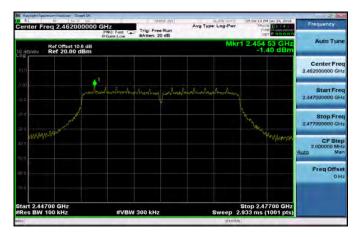


802.11g PSD FOR BANDEDGE LIMIT (CH-High)



802.11n_HT20 PSD FOR BANDEDGE LIMIT (CH-Low)





802.11n_HT20 PSD FOR BANDEDGE LIMIT (CH-High)

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802.11b Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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



Band Edges Test Data CH-High



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

SG



Band Edges Test Data CH-High



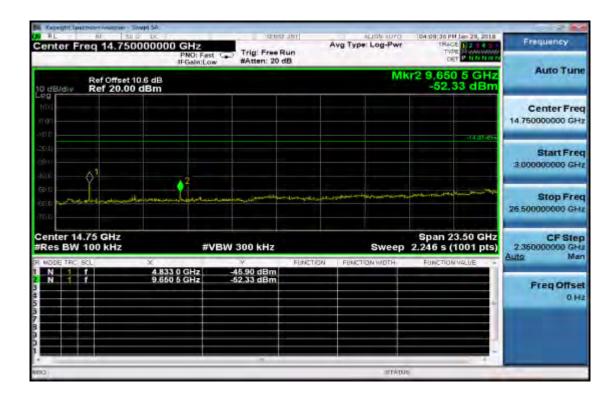
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802.11b **Spurious Emission Test Data CH-Low**

RL RP 1	th G DC	SENS.	1.181	ALION AUTO	04:08:44 PM	Jan 29, 2018	
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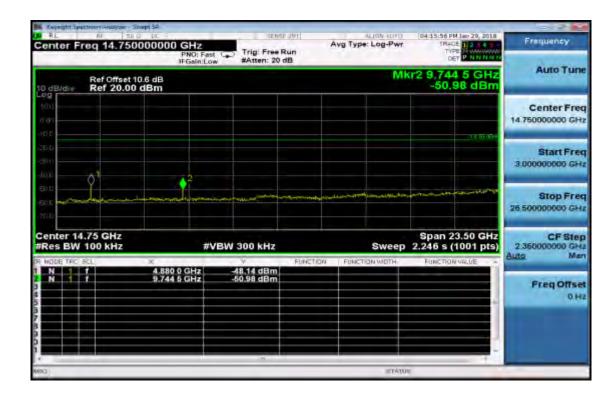
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Spurious Emission Test Data CH-Mid

Repair Spectrolers Analyzer - Street					
Center Freq 1.515000	0000 GHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pw		Frequency
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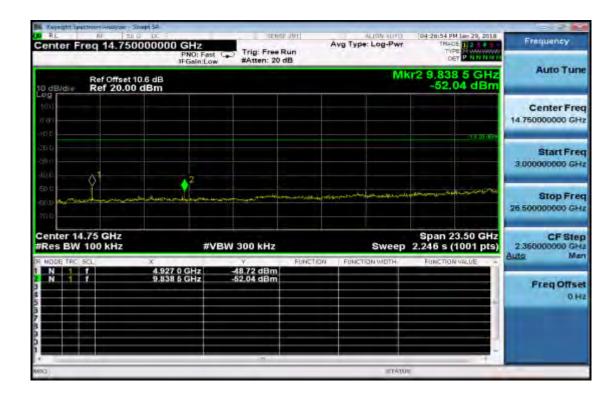
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Spurious Emission Test Data CH-High

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	5,72 dBm			Freq Offse 0 H
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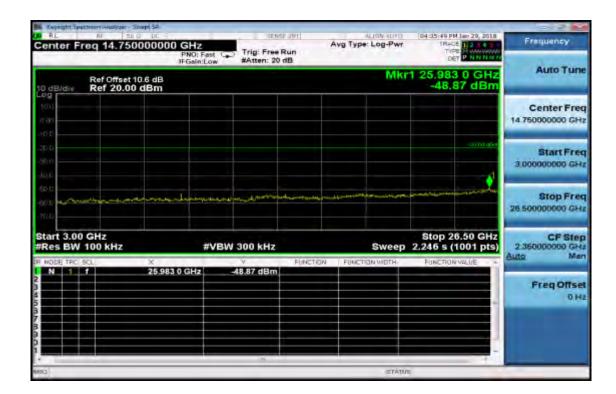
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802.11g **Spurious Emission Test Data CH-Low**

-	04:35:15 PM Jan 29, 2018	ALION AUTO	a unit			apt SA	Hannyaer - Si	phit Spactosan	RL
Frequency	TRACE 1 2 1 4 1 TYPE NUMBER	g Type: Log-Pwr	Run		NO: Fast Gain: Low	00000 GH			
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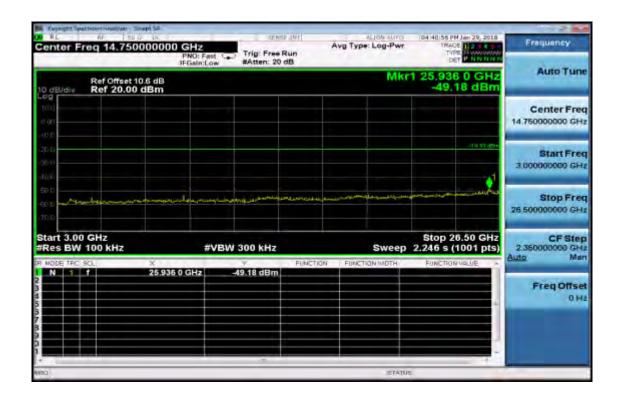
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Spurious Emission Test Data CH-Mid

RL NP 15000000 enter Freq 1.515000000	GHZ PNO: Fast	Trig: Free Run #Atten: 20 dB	Avg Type: Log-Pwr	04:40:25 PM Jan 29, 2518 FRAGE 1 2 3 4 3 TYPE IN WARKANN DET P IN IV II IN IV	Frequency
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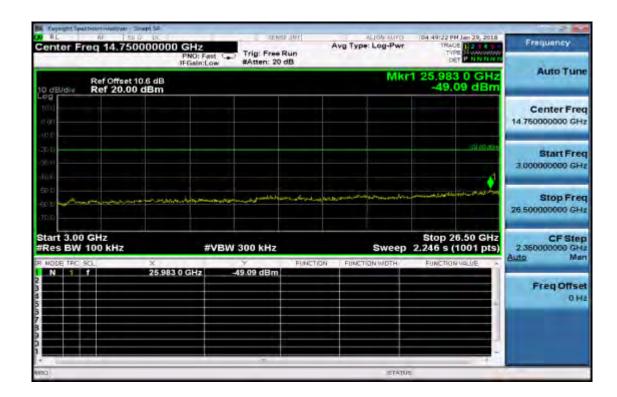
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Spurious Emission Test Data CH-High

Konnight Spectrem Analyzer - Skept SP		and the second	10 M 10 M
Center Freq 1.51500000	PNO: Fest + Trig: Free Run HEGSIN Low #Atten: 20 dB	Avg Type: Log-Pwr TRACE 12 Avg Type: Log-Pwr TRACE 12 OCT P NO	Frequency
Ref Offset 10.6 dB	ProsiniLow written: 20 up	Mkr1 2.456 5 G -0.79 dE	
.eg 1001 11 01		¢'	Center Free 1,515000000 GH
400		autre and a second s	Start Free 30.000000 MH
ED U ED U 70 D	pta and catheologic constants and a second of the second		Stop Free 3.00000000 GH
Start 30 MHz #Res BW 100 kHz # MODE TPC SCL x	#VBW 300 kHz	Stop 3.000 G Sweep 283.9 ms (1001 p	HZ 297,00000 MH Auto Mar
N 1 1 2.48	56 5 GHz -0,79 dBm		Freq Offse 0 H
eal	Th.	STATUS	



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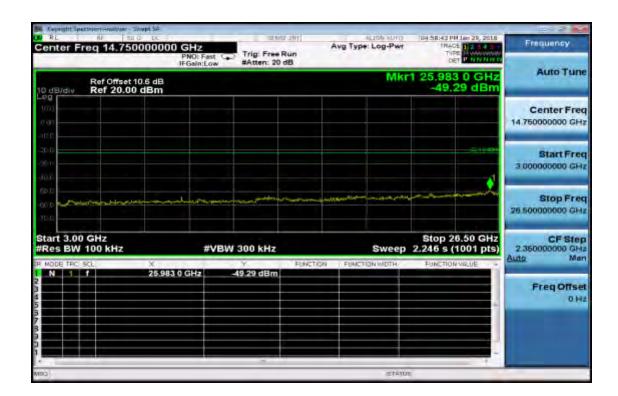
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802.11n HT20 **Spurious Emission Test Data CH-Low**

enter Freg 1.515000000	PNO: East () Trig: Free Run	Aug Type: Log-Pwr TRACE 12 4 TYPE Point	Frequency
Ref Offset 10.6 dB	IFGain:Low #Atten: 20 dB	Mkr1 2.406 0 GH -2.12 dB	Auto Tune
			Center Free 1,515000000 GH
		210	Start Free 30,000000 MH
D D D D D		internet manufacture	Stop Fre 3.00000000 GH
tart 30 MHz Res BW 100 kHz MODE TRC SCL X	#VBW 300 kHz	Stop 3.000 GF Sweep 283.9 ms (1001 pt Function width: Function value	
N 1 1 2.400	-2.12 dBm		Freq Offse 0 H



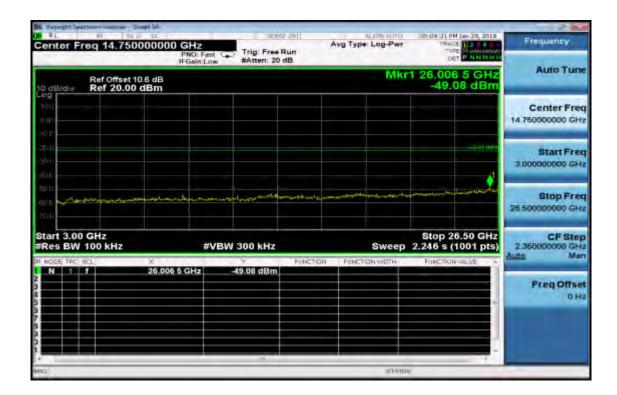
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Spurious Emission Test Data CH-Mid

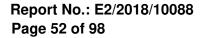
Keynight Spectreen Analyzer - Skept SA					
Center Freq 1.515000000	GHz PNO: Fast	Trig: Free Run #Atten: 20 dB	Avg Type: Log-Pwr	ICD:04:00 PM Jan 29, 2018 TRACE 2 2 4 5 T TYPE PLONGROUP OFT PLONGROUP	Frequency
Ref Offset 10.6 dB Ref 20.00 dBm			MK	1 2,429 8 GHz -2,01 dBm	Auto Tune
1001 1001 1001 1001 1001				,	Center Fred 1.515000000 GHz
-30.0 -3000 -4000				-19 V] 409 4	Start Free 30.000000 MHz
50 0 60 0 70 0	and the second states of the		Way and the second s	Sum in grand straight	Stop Free 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW :	300 kHz		Stop 3.000 GHz 3.9 ms (1001 pts)	CF Step 297.000000 MH Auto Mar
	9 8 GHz -	-2.01 dBm		PDRUMON WHEN C	Freq Offse 0 H
(Cen		T.	erátus		



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Spurious Emission Test Data CH-High

RL 1 1 20 2 Center Freq 1.51500	DC.	Trig: Free Run #Atten: 20 dB	Avg Type: Log-Pwr	IDS:14:51 PM Jan 29, 2018 TRACE 1 2 4 4 5 TYPE DOWNLOW	Frequency
Ref Offset 10 Ref 20.00 c	.6 dB		M	r1 2.456 5 GHz -1.70 dBm	Auto Tuni
100 man				*	Center Free 1.515000000 GH
20.0 Shri 40.0					Start Free 30.000000 MH
60 0 60 0 70 0	and the second	and the strategy of the strate	والمستعرف والمتعاد والمعالم والمستعم والمستعم والمستعر	A Constanting and the	Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VE	W 300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Ste 297,000000 MH Auto Ma
N 1 T	2.455 5 GHz	-1.70 dBm			Freq Offse 0 H
20		m	STATU	4	

Frequency	CS:15:29 PM Jan 29, 2518 TRACE 2 2 34 5 TYPE PLONGOUND OET PLN N N OF	vg Type: Log-Pwr			GHZ PND: Fast Cal	.750000000	ter Freq 14.
Auto Tur	25.912 5 GHz -49.01 dBm	Mkr1				fset 10.6 dB 0.00 dBm	Ref Off B/div Ref 2
Center Fre 14.750000000 GF							
Start Fre 3.000000000 GF							
Stop Fre 26 50000000 GH	barnon marine		بو زمان میں منصول استان میں اور	territ and the second	مىلىمىمىيىنى مەلىكىمىيەت مەلىرىمى	مردومة «ما يعظ فيرموري».	استاد المحاود المحار
CF Ste 2.35000000 GH Auto Ma	Stop 26.50 GHz 2.246 s (1001 pts)	Sweep	FUNCTION	300 kHz	#VBW	iz x	t 3.00 GHz s BW 100 kH
Freq Offs 01	_			49.01 dBm	5 GHz	25.912	
		STÁTUS		m			

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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

Standard Applicable 11.1

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 & RSS-Gen §8.10 Table 6 limit as below.

And according to §15.33(a) (1) & RSS-Gen §8.9 Table 4 & 5, 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 $(dB\mu V/m) = 20 \log Emission \, \text{level} \, (dB\mu V/m)$

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11.2 Measurement Equipment Used:

		966 Chambe	r		
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2017	12/22/2018
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2017	11/02/2018
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2017	12/16/2018
Horn Antenna	Schwarzbeck	BBHA9170	185	08/01/2017	07/31/2018
Pre Amplifier	EMC Instruments	EMC330	980096	12/24/2017	12/23/2018
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/24/2017	12/23/2018
Pre Amplifier	R&S	SCU-18	10204	12/24/2017	12/23/2018
Pre Amplifier	R&S	SCU-26	100780	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/24/2017	12/23/2018
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/24/2017	12/23/2018
Attenuator	WOKEN	218FS-10	RF27	12/24/2017	12/23/2018
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

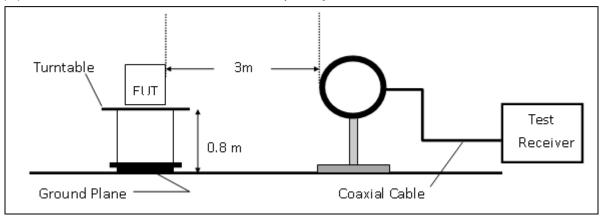
NOTE: N.C.R refers to Not Calibrated Required.

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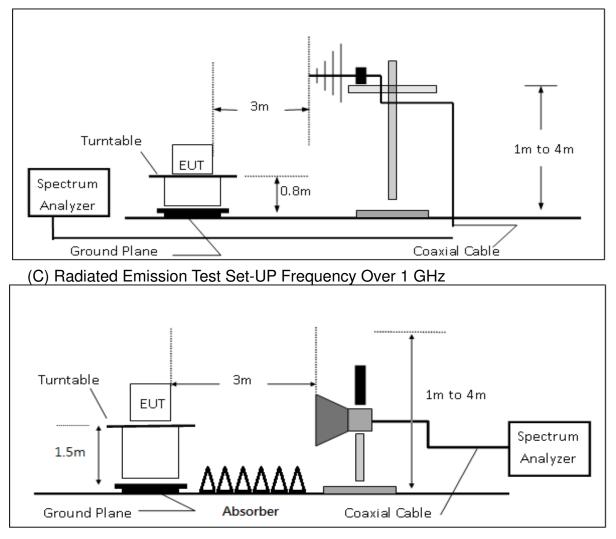


11.3 Test SET-UP

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



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



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

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

Factor(dB) = Antenna Factor(dB μ 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.

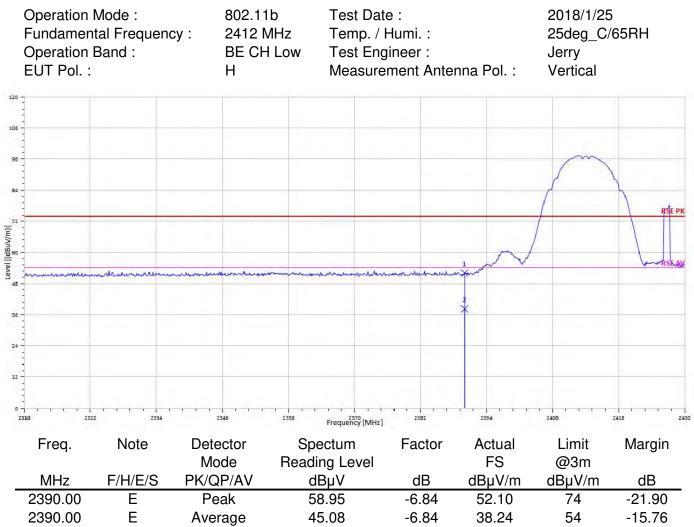
Note: There is a comparison data of both open-field test site and semi-Anechoic, and test result came out very similar.

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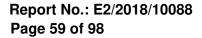


Radiated Band Edge Measurement Result (802.11b)



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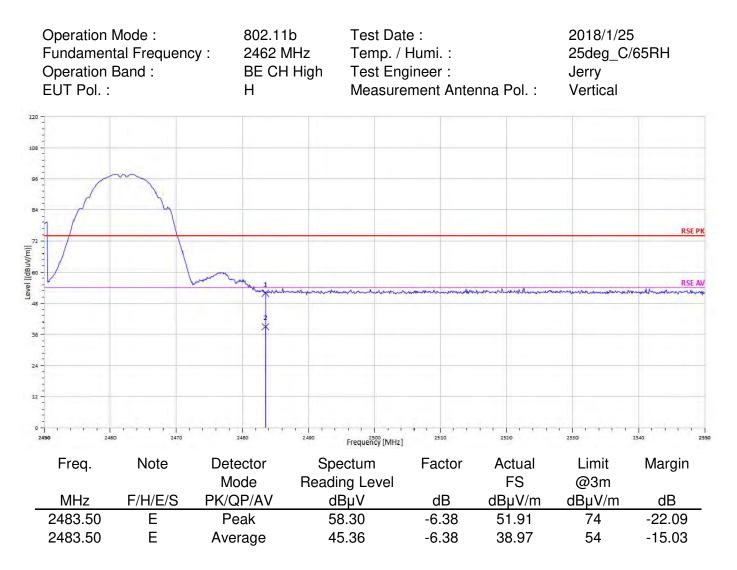


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108 -									
96									w
B4 -								1	RSEPK
Level [(dBuV/m)]									
laval 48	man	m	www.	mmmm	romannanta	kton man market	Strand Vr		RSEAV
36							2		
24									
12									
2310	0 232:	2 2334	2346	2358	Frequency [MHz]	2362	2394	2406	2418 2430
	Freq.	Note	Detector Mode	•	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV		BµV	dB	dBµV/m	dBµV/m	dB
	2390.00	E	Peak		8.68	-6.84	51.84	74	-22.16
	2390.00	Е	Average	44	1.83	-6.84	37.99	54	-16.01

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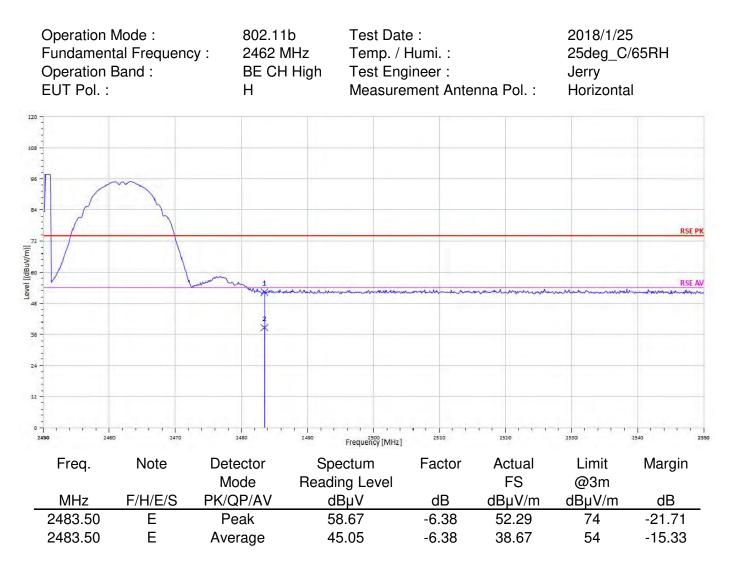


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Report No.: E2/2018/10088 Page 61 of 98

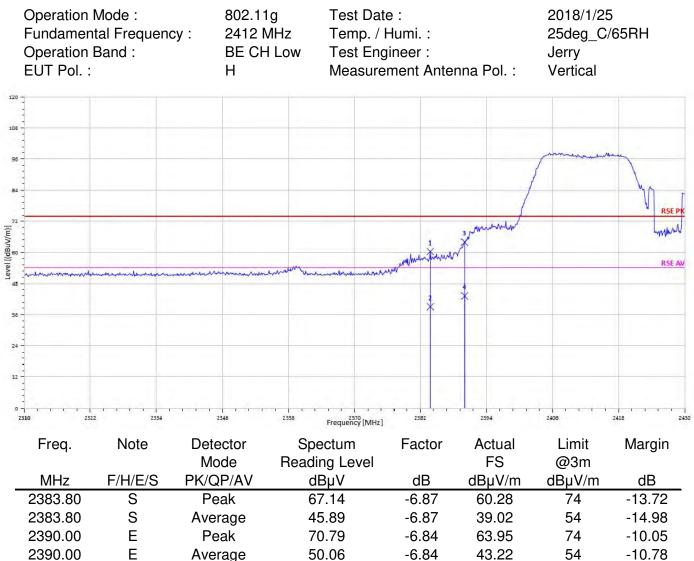


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Radiated Band Edge Measurement Result (802.11g)

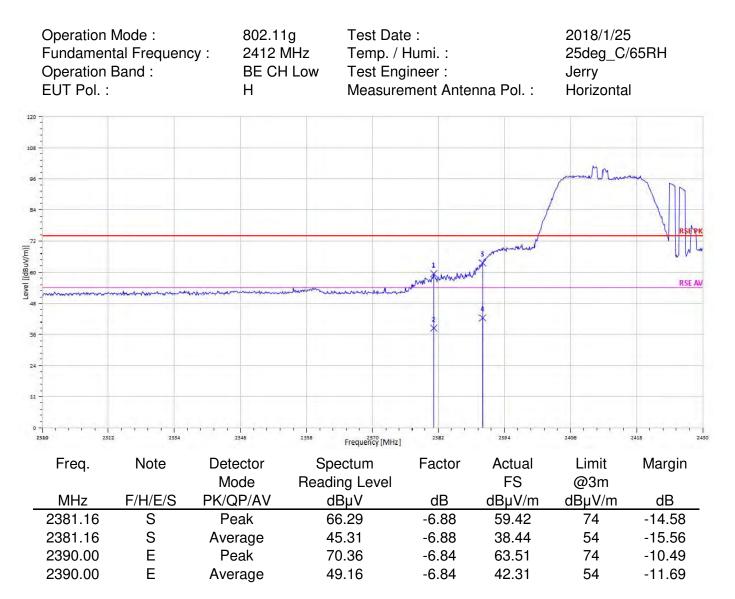


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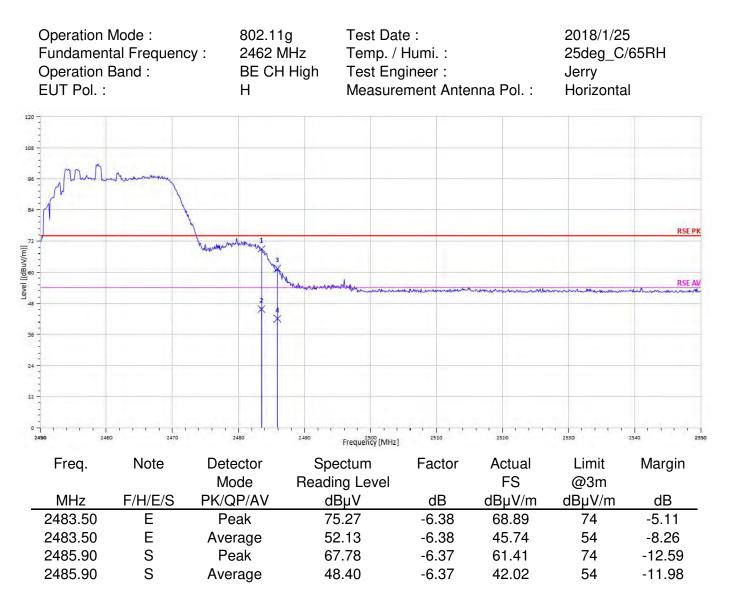
Report No.: E2/2018/10088 Page 64 of 98

Fundamental Frequency : 2462 MHz Temp. / Humi. : 25deg_ Operation Band : BE CH High Test Engineer : Jerry EUT Pol. : H Measurement Antenna Pol. : Vertical Image: State of the stat	2018/1/29 25deg_C Jerry Vertical						
	moundarthe						
84	1						
							RSE PK
		WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW					
- 00 00 00 00			Wellen and and and and and and and and and an	manhammum	manument	- Anno Man Marson Marson	RSE AV
48		**					
36							
24							
12							
	2460 2470	2480	2490 Frequency	[MHz] 2510	2520	2530	2540 2550
Freq.	Note						Margin
MHz	F/H/F/S		-		-	-	dB
							-5.22
							-8.25
		•					-10.49
2485.10		Average	49.97	-6.38	43.59	54	-10.41

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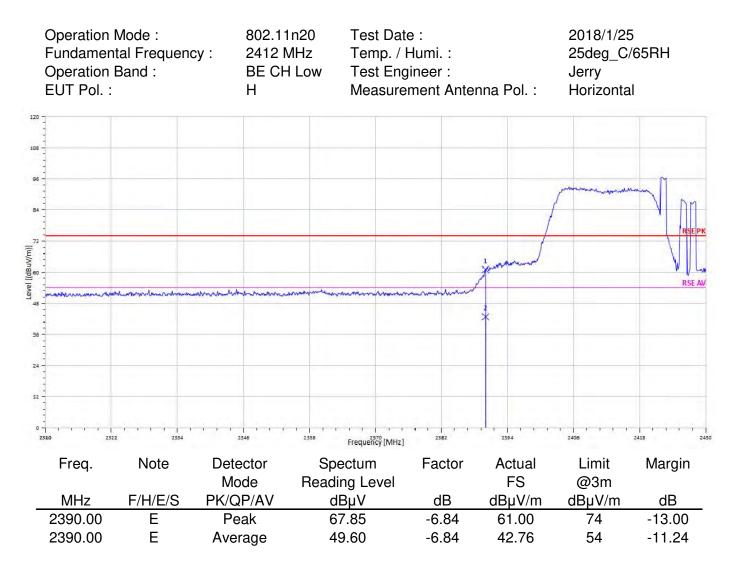


Radiated Band Edge Measurement Result (802.11_HT20)

	Operation Fundamen Operation EUT Pol. :	tal Frequence	802.11 cy : 2412 M BE CH H	ЛНz	Test Date Temp. / H Test Eng Measurer	lumi. :	nna Pol. :	2018/1/25 25deg_C/ Jerry Vertical	
120 -									
108 -									
96 -							/	monum	
72							/		RSEPK
Level [(dBuV/m)]							1 million		V hall
[] level	ammunuh	nmahmmn	muum	man	man	and the second second of the second s			RSE AV
36 -							*		
74									
12 -									
0 - 23	10 232;	2. 2334	2346	2358	²⁵⁷⁰ Frequency [MHz]	2382	2394	2405	2418 2430
	Freq.	Note	Detector Mode	•	ctum Ig Level	Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV		βμV	dB	dBµV/m	dBµV/m	dB
_	2390.00	E	Peak		.30	-6.84	62.46	74	-11.54
	2390.00	E	Average	48	.85	-6.84	42.00	54	-12.00



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Operation Fundamen Operation EUT Pol. :	ital Frequence		MHz H High	Test Date Temp. / H Test Eng Measure	lumi. : ineer :	nna Pol. :	2018/1/29 25deg_C Jerry Vertical	
120								
108								
96	community							
84	1	4						
272		Unum munit						RSE PK
L .		Murray and						
72 - [[[Mummer how	Monemente	man management	www.m.m.	manne	RSE AV
48		*						
36							_	
24								
12								
2450 246	50 2470	2480	2490 _		2510	2520	2530	2540 2550
			F	requency [MHz]				
Freq.	Note	Detector Mode	Spec Reading		Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBı	-	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Peak	74.	61	-6.38	68.23	74	-5.77
2483.50	Е	Average	52.	56	-6.38	46.17	54	-7.83
2484.50	S	Peak	75.3	35	-6.38	68.97	74	-5.03
2484.50	S	Average	51.	57	-6.38	45.19	54	-8.81

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F	Dperation I Fundament Dperation I EUT Pol. :	tal Frequen	cy :	802.11r 2462 M BE CH H	Hz	Test Dat Temp. / I Test Eng Measure	Humi. : jineer :	enna Pol. :	2018/1/29 25deg_C Jerry Horizonta	/65RH
120										
108 -	Mamm	0								
B4	Anwer	a comment								
1	/			13						RSE PK
Level [(dBuV/m)]			hunorthan	Mining						
evel [(dB				1	Madavallan	Withhaman	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm		non-manadada	RSE AV
48				**						
36 -										
24 -										
12 -										
										
2450			24			Frequency [MHz]	2510	2520	2530	2540 2550
	Freq.	Note	Deteo Moo		Speo Readin	ctum g Level	Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QF	P/AV	dB	•	dB	dBµV/m	dBµV/m	dB
	2483.50	E	Pea	ak	75.		-6.38	69.04	74	-4.96
	2483.50	E	Avera	•	52.		-6.38	45.98	54	-8.02
	2484.40	S	Pea		75.		-6.38	69.01	74	-4.99
	2484.40	S	Avera	age	51.	.57	-6.38	45.19	54	-8.81

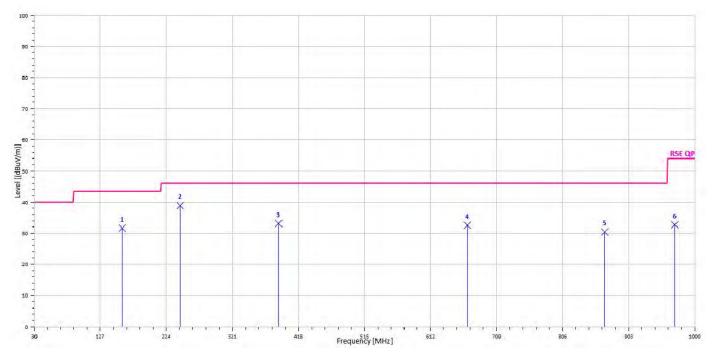
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Below 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	2018/1/26
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	25deg_C/65RH
Operation Band :	Tx CH Low	Test Engineer :	Jerry
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
159.01	S	Peak	47.22	-15.57	31.65	43.5	-11.85
244.37	S	Peak	55.87	-17.00	38.87	46	-7.13
388.90	S	Peak	46.25	-13.13	33.12	46	-12.88
666.32	S	Peak	41.02	-8.48	32.54	46	-13.46
868.08	S	Peak	36.72	-6.32	30.40	46	-15.60
970.90	S	Peak	36.79	-4.06	32.72	54	-21.28

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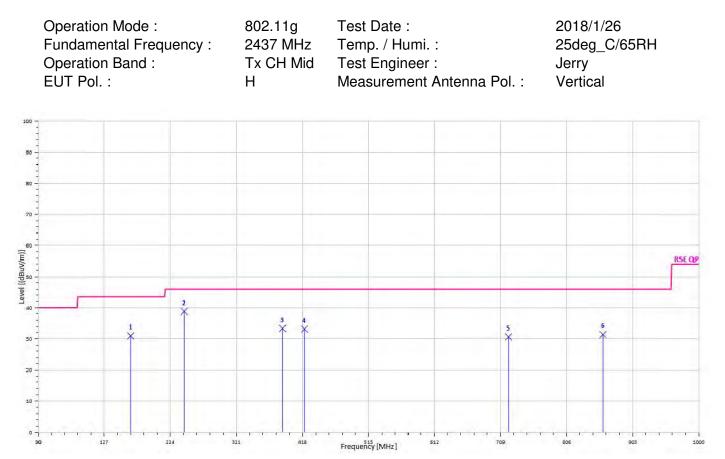


Fundamer	ndamental Frequency : eration Band :		ndamental Frequency : 2412 MHz Ter peration Band : Tx CH Low Tes		Temp. / Humi. : Test Engineer :			
							RS	
1 *	2	3 × 4 ×			5 X		6 X	

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	50.72	-19.96	30.76	40	-9.24
198.78	S	Peak	53.23	-18.65	34.58	43.5	-8.92
241.46	S	Peak	55.89	-16.98	38.92	46	-7.08
291.90	S	Peak	48.73	-15.45	33.28	46	-12.72
720.64	S	Peak	39.77	-7.54	32.23	46	-13.77
941.80	S	Peak	37.25	-4.57	32.68	46	-13.32

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Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
165.80	S	Peak	47.01	-16.07	30.94	43.5	-12.56
244.37	S	Peak	55.80	-17.00	38.79	46	-7.21
388.90	S	Peak	46.49	-13.13	33.36	46	-12.64
420.91	S	Peak	45.25	-12.09	33.16	46	-12.84
720.64	S	Peak	38.15	-7.54	30.60	46	-15.40
859.35	S	Peak	37.48	-6.09	31.39	46	-14.61

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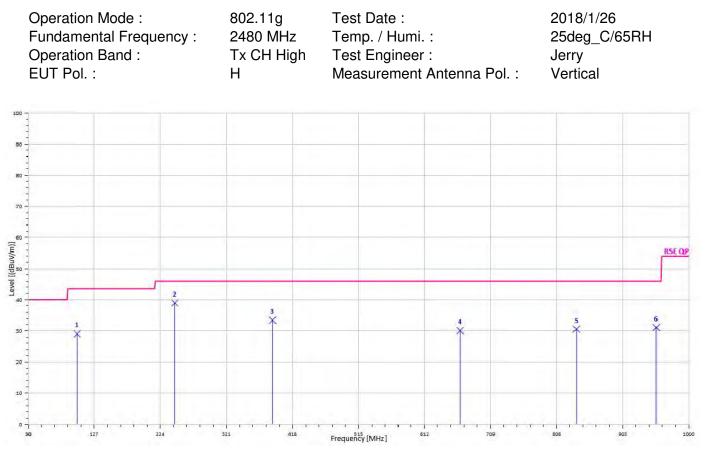
Operation Mc Fundamental Operation Ba EUT Pol. :	Frequency :	802.11g 2437 MHz Tx CH Mid H	Test Date : Temp. / Humi. : Test Engineer : Measurement An	2018/1/26 25deg_C/65RH Jerry Horizontal		
						R
1 X	2 X 3 X	4		5 *		6
127	224	1 I I I I I I I I I I I I I I I I I I I	Frequency [MHz] 512			

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
72.68	S	Peak	52.40	-19.79	32.61	40	-7.39
234.26	S	Peak	56.61	-17.39	39.21	46	-6.79
281.23	S	Peak	52.57	-15.65	36.92	46	-9.08
388.90	S	Peak	44.17	-13.13	31.04	46	-14.96
663.41	S	Peak	43.95	-8.32	35.63	46	-10.37
951.50	S	Peak	35.71	-4.61	31.11	46	-14.89

Frequency [MHz]



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Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
101.78	S	Peak	50.18	-21.13	29.05	43.5	-14.45
245.34	S	Peak	55.92	-17.01	38.92	46	-7.08
388.90	S	Peak	46.55	-13.13	33.42	46	-12.58
664.38	S	Peak	38.44	-8.37	30.07	46	-15.93
835.10	S	Peak	36.40	-5.86	30.54	46	-15.46
952.47	S	Peak	35.67	-4.59	31.08	46	-14.92

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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Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	52.57	-19.96	32.60	40	-7.40
233.34	S	Peak	56.47	-17.46	39.01	46	-6.99
291.90	S	Peak	53.65	-15.45	38.20	46	-7.80
388.90	S	Peak	44.28	-13.13	31.15	46	-14.85
722.58	S	Peak	40.19	-7.58	32.61	46	-13.39
884.57	S	Peak	37.26	-5.98	31.28	46	-14.72

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 (802.11 b)

Operation Fundamen Operation EUT Pol.	•		Test Date Temp. / H Test Eng Measure	łumi. :	2018/1/25 25deg_C/65RH Jerry Vertical			
							_	
								RSE P
		5 X 3 X						RSE A
	1	×						
							· · · · · · ·	
Freq.	o 6100 Note	Detector	11200 Sp	Frequency [MHz]	Factor	Actual	Limit	Margin
		Mode		ling Level	JD	FS	@3m	-10
MHz 4824.00	F/H/E/S H	PK/QP/AV Peak		/ΒμV 16.02	dB -1.04	dBµV/m 39.70	<u>dBµV/m</u> 74	dB -34.30
4824.00 4824.00	H			16.02 38.77	-1.04 -1.04	39.70 37.73	74 54	-34.30 -16.27
4824.00 7236.00	H	Average Peak		3.41	-1.04 5.63	37.73 49.03	54 74	-16.27 -24.97
7236.00	H	Average		3.41 32.51	5.63	49.03 38.13	74 54	-24.97 -15.87
9648.00	H	Peak		7.48	8.54	56.02	74	-17.98

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.

Average

Н

9648.00

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43.19

8.54

51.73

54

-2.27



Fundamental Frequency : Operation Band : EUT Pol. :			802.11bTest Date :2412 MHzTemp. / Humi. :Tx CH LowTest Engineer :HMeasurement Antenna Pol. :				2018/1/25 25deg_C/65RH Jerry Horizontal						
00 - 													
BO													RSE PK
70													
50		3	5										RSE AV
50	×	¥.	*										
40	×	1											
30													
20													
10													
0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	50 5100		a	11200	Frequency [Mł	Iz]	6300	188	50	21400		23950	2650
Freq.	Note	Deteo Moc		•	ectum ing Level	Fa	ctor		tual FS	Lin @3		Margi	n
MHz	F/H/E/S	PK/QF	P/AV		BμV		dB		µV/m	dBµ		dB	
4824.00	Н	Pea			5.22		.04		4.18	7		-29.82	
4824.00	Н	Avera	0		7.89		.04		5.85	5		-17.1	
7236.00	Н	Pea			4.34		.63		9.97	7		-24.03	
7236.00	Н	Avera	•		5.03		.63).66	5		-13.34	
9648.00	Н	Pea			6.58		.54		5.12	7		-18.88	
9648.00	Н	Avera	age	4	1.10	8	.54	49	9.63	5	4	-4.37	,



Fundamental Frequency : Operation Band : EUT Pol. :			802.11bTest Date :2437 MHzTemp. / Humi. :Tx CH MidTest Engineer :HMeasurement Antenna Pol. :				2018/1/25 25deg_C/65RH Jerry Vertical				
00 - 											
80											RSE PK
70 -											
60		3 X	5 **								RSE AV
50	1 X	4									
40 - 	×										
20											
10									_		
0	50 6100		i i i	11200	Frequency [M	1Hz] 1	i i i 6300	1 1 1	i i i 50	21400	
Freq.	Note	Deteo Moo		•	ectum ing Leve	Fa	ctor		ctual FS	Limi @3n	5
MHz	F/H/E/S	PK/QF	P/AV		lBμV		dB	dB	µV/m	dBµV	
4874.00	Н	Pea	ak		7.59		.75		5.85	74	-27.15
4874.00	Н	Avera	•		9.22		.75	-	3.47	54	-15.53
7311.00	Н	Pea			5.71		.10		1.81	74	-22.19
7311.00	Н	Avera	•		3.87		.10		9.97	54	-14.03
9748.00	Н	Pea			8.07		.48		5.54	74	-17.46
9748.00	Н	Avera	age	4	3.38	8	.48	5	1.85	54	-2.15



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Fundamental Frequency : Operation Band : EUT Pol. :			802.11bTest Date :2437 MHzTemp. / Humi. :Tx CH MidTest Engineer :HMeasurement Antenna Pol. :				2018/1/25 25deg_C/65RH Jerry Horizontal			
100 - - 										
B0										RSE PK
70										
60		3	5							RSE AV
40-	X	*	*							
30	×									
20 -										
10										
0 1 1 1 1 1		, , , , , , , , , , , , , , , , , , ,	11200	Frequency [MHz	 .] ¹⁶	300	1 1 1885	, <u>, ,</u>	-1 1 1 1	23950 26500
Freq.	Note	Detect Mode		pectum ding Level		ctor		tual S	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/		dBµV		IB	dB	ıV/m	dBµV/m	dB
4874.00	Н	Peak		46.75		.75		.01	74	-27.99
4874.00	Н	Averag	,	38.57		.75		.82	54	-16.18
7311.00	Н	Peak		46.83		10		.93	74	-21.07
7311.00	Н	Averag	,	36.12		10		.22	54	-11.78
9748.00	Н	Peak		46.67		48		.15	74	-18.85
9748.00	Н	Averag	je	41.19	8.	48	49	.66	54	-4.34

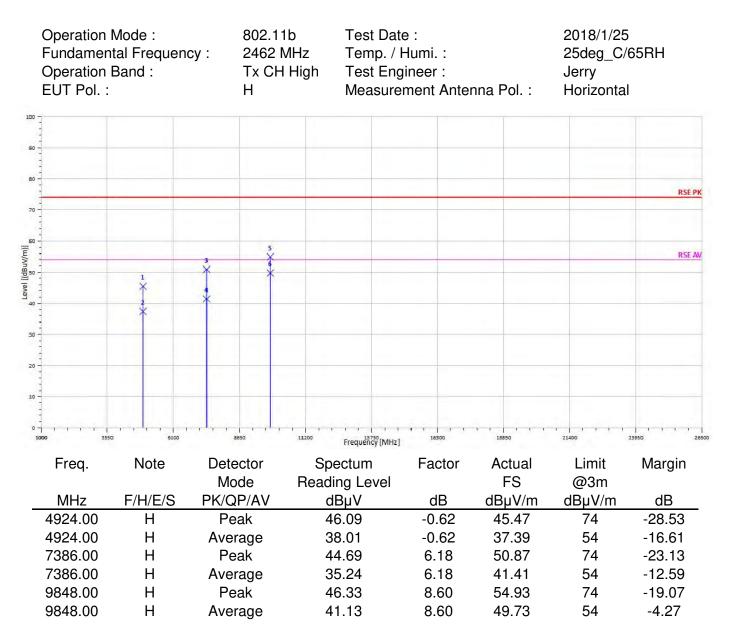


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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :			802.11 2462 M Tx CH H	ИНz	Temp. / Test En	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :					/1/25 g_C/6 cal	65RH	
90													
80													
70												RS	SEPK
60 [E			5									RS	SE AV
revel [[dBu//m]]	1 X	3	×										
40	×	*											-
30													
20													
		, , , , , , , , , , , , , , , , , , ,						,			-1-1-	1	- 1
1000 3550 Freq.	Note	Dete	ctor	11200 Spe	Frequency [MH		ctor	1881 AC	≋ tual	Lim		Margin	26500
		Mo			ng Level				-S	@3		June 2	
MHz	F/H/E/S	PK/Q	P/AV	d	ΒµV	C	IB	dBj	JV/m	dBµ∖	//m	dB	
4924.00	Н	Pe	ak	4	6.37	-0	.62	45	5.75	74		-28.25	_
4924.00	Н	Aver	•	39	9.10	-0	.62	38	8.48	54		-15.52	
7386.00	Н	Pe	ak	4:	3.02	6.	18	49	9.20	74		-24.80	
7386.00	Н	Aver	age	33	2.28	6.	18	38	8.45	54		-15.55	
9848.00	Н	Pe	ak	4	7.97	8.	60	56	6.57	74		-17.43	
9848.00	Н	Aver	age	4;	3.20	8.	60	51	.80	54		-2.20	



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Radiated Spurious Emission Measurement Result (802.11 g)

	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :	802.11g 2412 MHz Tx CH Low H	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :	2018/1/25 25deg_C/65RH Jerry Vertical	
.00					
90					
BO				RSE P	
0					
50		5			
50	3	Ť.		RSE A	
10	1 X	×			
••					
50	*				
20					
10	1				
0					

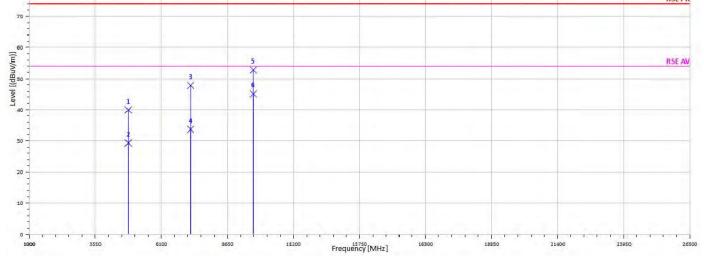
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	43.59	-1.04	42.55	74	-31.45
4824.00	Н	Average	29.54	-1.04	28.50	54	-25.50
7236.00	Н	Peak	39.82	5.63	45.45	74	-28.55
7236.00	Н	Average	27.14	5.63	32.77	54	-21.23
9648.00	Н	Peak	45.93	8.54	54.47	74	-19.53
9648.00	Н	Average	39.19	8.54	47.73	54	-6.27

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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :	802.11g 2412 MHz Tx CH Low H	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :	2018/1/25 25deg_C/65RH Jerry Horizontal
90			
80			RSEPK

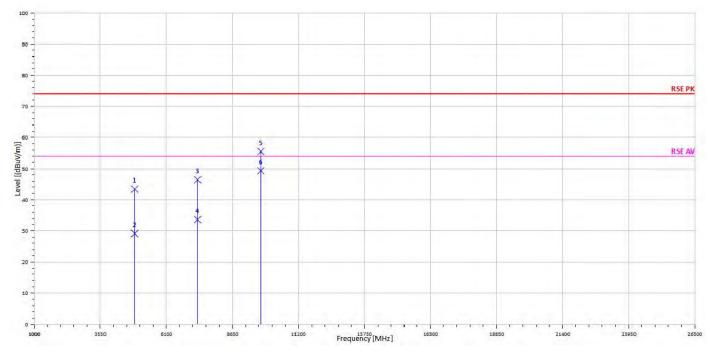


Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	40.95	-1.04	39.91	74	-34.09
4824.00	Н	Average	30.36	-1.04	29.32	54	-24.68
7236.00	Н	Peak	42.15	5.63	47.78	74	-26.22
7236.00	Н	Average	28.09	5.63	33.72	54	-20.28
9648.00	Н	Peak	44.21	8.54	52.75	74	-21.25
9648.00	Н	Average	36.57	8.54	45.11	54	-8.89

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 Mode :	802.11g	Test Date :	2018/1/25	
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	25deg_C/65RH	
Operation Band :	Tx CH Mid	Test Engineer :	Jerry	
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical	



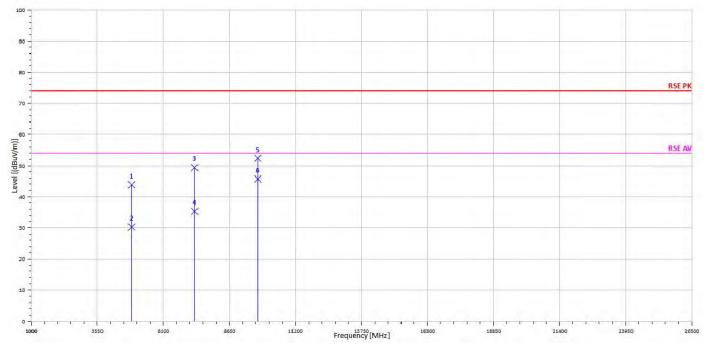
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	44.12	-0.75	43.37	74	-30.63
4874.00	Н	Average	29.89	-0.75	29.15	54	-24.85
7311.00	Н	Peak	40.33	6.10	46.43	74	-27.57
7311.00	Н	Average	27.53	6.10	33.63	54	-20.37
9748.00	Н	Peak	47.02	8.48	55.50	74	-18.50
9748.00	Н	Average	40.84	8.48	49.31	54	-4.69

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 Mode :	802.11g	Test Date :	2018/1/25	
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	25deg_C/65RH	
Operation Band :	Tx CH Mid	Test Engineer :	Jerry	
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal	



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	44.54	-0.75	43.79	74	-30.21
4874.00	Н	Average	30.97	-0.75	30.22	54	-23.78
7311.00	Н	Peak	43.29	6.10	49.39	74	-24.61
7311.00	Н	Average	29.17	6.10	35.27	54	-18.73
9748.00	Н	Peak	43.86	8.48	52.34	74	-21.66
9748.00	Н	Average	37.22	8.48	45.70	54	-8.30

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Fi Of	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		2462 M	802.11g 2462 MHz Tx CH High H		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2018/1/25 25deg_C/65RH Jerry Vertical		
90											
0											RSE P
				5							RSE 4
		1 ×	3 × 4	×							
		*									

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	43.97	-0.62	43.35	74	-30.65
4924.00	Н	Average	30.02	-0.62	29.39	54	-24.61
7386.00	Н	Peak	40.22	6.18	46.39	74	-27.61
7386.00	Н	Average	27.36	6.18	33.54	54	-20.46
9848.00	Н	Peak	44.74	8.60	53.34	74	-20.66
9848.00	Н	Average	38.95	8.60	47.55	54	-6.45



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Funda Opera	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11g 2462 MHz Tx CH High H		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2018/1/25 25deg_C/65RH Jerry Horizontal	
90									
70									RSE PI
		3	5 ×						RSE A
	1	*	*						
, <u>-</u>	*								

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	43.84	-0.62	43.21	74	-30.79
4924.00	Н	Average	30.28	-0.62	29.66	54	-24.34
7386.00	Н	Peak	43.30	6.18	49.48	74	-24.53
7386.00	Н	Average	28.61	6.18	34.79	54	-19.21
9848.00	Н	Peak	44.38	8.60	52.98	74	-21.02
9848.00	Н	Average	36.48	8.60	45.08	54	-8.92



Radiated Spurious Emission Measurement Result (802.11_HT20)

	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :	802.11n20 2412 MHz Tx CH Low H	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :	2018/1/25 25deg_C/65RH Jerry Vertical
.00				
90 -				
80 -				RSEI
50 -		5		
so -	3 1. X	* *		RSE
0 -				
0.	*			
10 -				
0.		8650 11200	Frequency[MHz] 16300 18850	21400 23950

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	43.97	-1.04	42.93	74	-31.07
4824.00	Н	Average	29.10	-1.04	28.06	54	-25.94
7236.00	Н	Peak	42.03	5.63	47.66	74	-26.34
7236.00	Н	Average	26.61	5.63	32.24	54	-21.76
9648.00	Н	Peak	45.63	8.54	54.16	74	-19.84
9648.00	Н	Average	39.46	8.54	47.99	54	-6.01

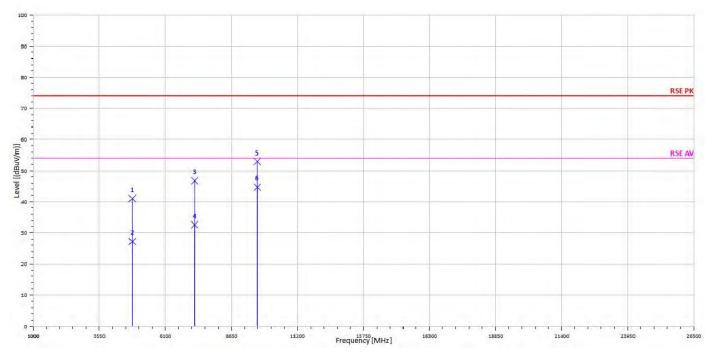
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Operation Mode :	802.11n20	Test Date :	2018/1/25
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	25deg_C/65RH
Operation Band :	Tx CH Low	Test Engineer :	Jerry
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal

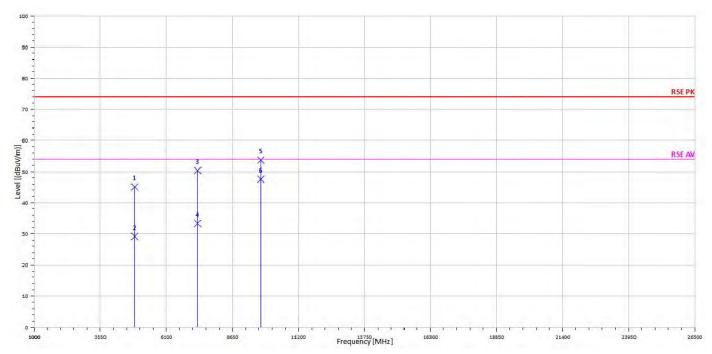


Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	42.10	-1.04	41.06	74	-32.94
4824.00	Н	Average	28.25	-1.04	27.21	54	-26.79
7236.00	Н	Peak	41.11	5.63	46.74	74	-27.26
7236.00	Н	Average	26.96	5.63	32.59	54	-21.41
9648.00	Н	Peak	44.37	8.54	52.91	74	-21.09
9648.00	Н	Average	36.14	8.54	44.68	54	-9.32

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 Mode :	802.11n20	Test Date :	2018/1/25
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	25deg_C/65RH
Operation Band :	Tx CH Mid	Test Engineer :	Jerry
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



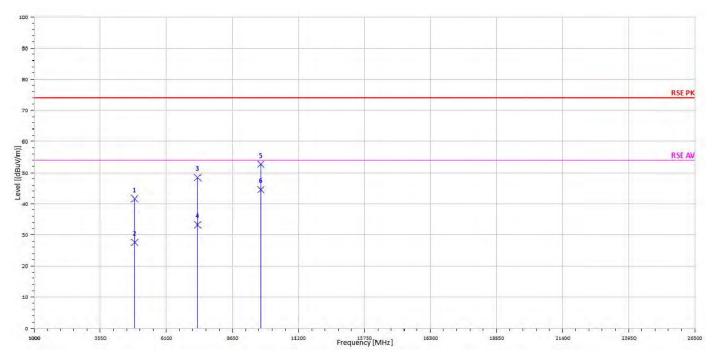
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	45.83	-0.75	45.08	74	-28.92
4874.00	Н	Average	29.93	-0.75	29.19	54	-24.81
7311.00	Н	Peak	44.24	6.10	50.34	74	-23.66
7311.00	Н	Average	27.23	6.10	33.33	54	-20.67
9748.00	Н	Peak	45.24	8.48	53.72	74	-20.28
9748.00	Н	Average	39.06	8.48	47.53	54	-6.47

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 Mode :	802.11n20	Test Date :	2018/1/25
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	25deg_C/65RH
Operation Band :	Tx CH Mid	Test Engineer :	Jerry
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal

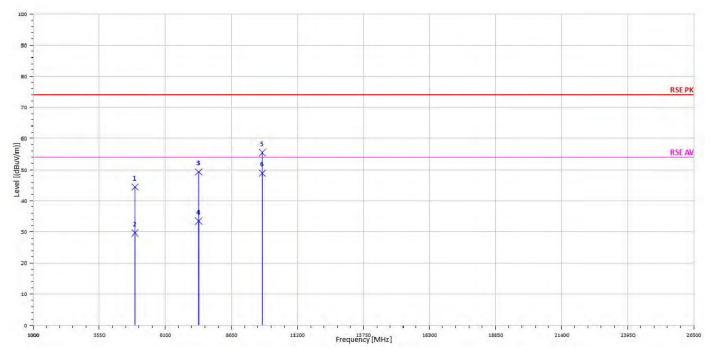


Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	42.38	-0.75	41.63	74	-32.37
4874.00	Н	Average	28.36	-0.75	27.61	54	-26.39
7311.00	Н	Peak	42.30	6.10	48.40	74	-25.60
7311.00	Н	Average	27.11	6.10	33.21	54	-20.79
9748.00	Н	Peak	44.21	8.48	52.69	74	-21.31
9748.00	Н	Average	36.06	8.48	44.54	54	-9.46

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 Mode :	802.11n20	Test Date :	2018/1/25
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	25deg_C/65RH
Operation Band :	Tx CH High	Test Engineer :	Jerry
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



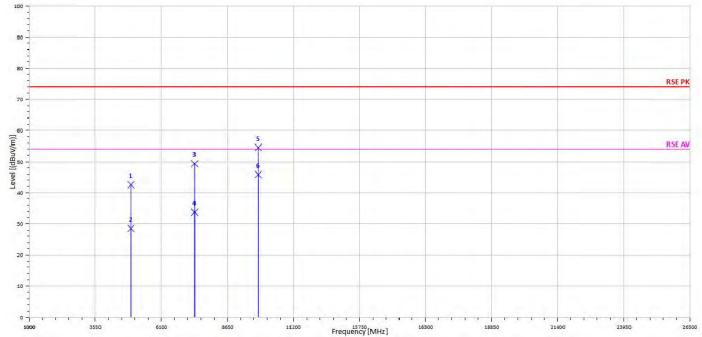
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	45.02	-0.62	44.40	74	-29.60
4924.00	Н	Average	30.25	-0.62	29.63	54	-24.37
7386.00	Н	Peak	43.12	6.18	49.29	74	-24.71
7386.00	Н	Average	27.27	6.18	33.45	54	-20.55
9848.00	Н	Peak	46.86	8.60	55.46	74	-18.54
9848.00	Н	Average	40.23	8.60	48.84	54	-5.16

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Operation Mode :802.11n20Test Date :Fundamental Frequency :2462 MHzTemp. / Humi. :Operation Band :Tx CH HighTest Engineer :EUT Pol. :HMeasurement Antenna Pol.	2018/1/25 25deg_C/65RH Jerry : Horizontal
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Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	43.21	-0.62	42.59	74	-31.41
4924.00	Н	Average	29.16	-0.62	28.54	54	-25.46
7386.00	Н	Peak	43.18	6.18	49.36	74	-24.64
7386.00	Н	Average	27.57	6.18	33.74	54	-20.26
9848.00	Н	Peak	45.90	8.60	54.50	74	-19.50
9848.00	Н	Average	37.23	8.60	45.84	54	-8.16

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12 PEAK POWER SPECTRAL DENSITY

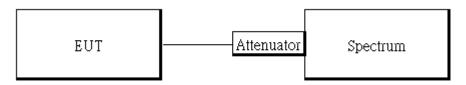
12.1 Standard Applicable

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 TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018			
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018			
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018			
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018			
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/24/2017	12/23/2018			
DC Block	PASTERNACK	PE8210	RF29	12/24/2017	12/23/2018			
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/24/2017	12/23/2018			
Attenuator	WOKEN	218FS-10	RF23	12/24/2017	12/23/2018			
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018			

12.3 Test Set-up



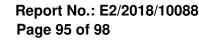
12.4 Measurement Procedure

- 10. Set analyzer center frequency to DTS channel center frequency.
- 11. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
- 12. Set the span to 1.5 times the DTS channel bandwidth.
- 13. Set the RBW = 3 kHz & VBW = 10 kHz.
- 14. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 15. Detector = peak.
- 16. Sweep time = auto couple.
- 17. Trace mode = max hold.
- 18. Allow trace to fully stabilize.
- 19. 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)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result			
2412	-7.78	10.60	0.10	-7.68	8.00	PASS			
2437	-8.42	10.60	0.10	-8.32	8.00	PASS			
2462	-7.25	10.60	0.10	-7.15	8.00	PASS			
	POW	ER DENS	SITY 802.	11g					
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result			
2412	-13.20	10.60	0.59	-12.61	8.00	PASS			
2437	-13.17	10.60	0.59	-12.58	8.00	PASS			
2462	-14.78	10.60	0.59	-14.19	8.00	PASS			
	POWER	DENSIT	Y 802.11r	n HT20					
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result			
2412	-16.80	10.60	0.63	-16.17	8.00	PASS			
2437	-16.26	10.60	0.63	-15.63	8.00	PASS			
2462	-15.15	10.60	0.63	-14.52	8.00	PASS			

*Refer to next page for plots



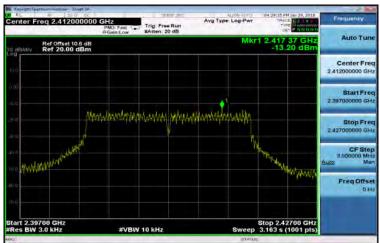
802.11b CH-Low



802.11b CH-Mid



802.11g CH-Low



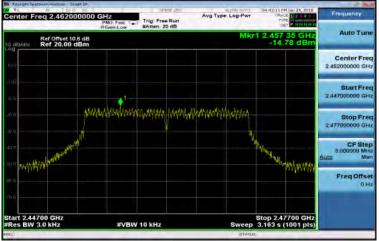
802.11g CH-Mid



802.11b CH-High



802.11g CH-High



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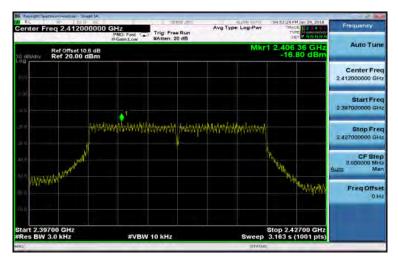
台灣檢驗科技股份有限公司

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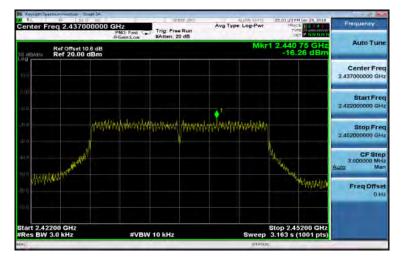
www.tw.sas.com



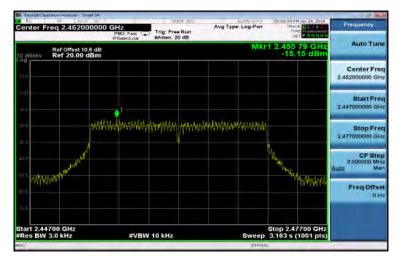
802.11n 20 CH-Low



802.11n 20 CH-Mid



802.11n 20 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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