

EN 301 893 RF Test Report (WLAN)

Report No.: RE171207E10I-3

Test Model: BLACK bean

Received Date: Jan. 17, 2017

Test Date: Jan. 17 to Apr. 17, 2017

Issued Date: Apr. 15, 2019

Applicant: UAB 8devices

Address: Antakalnio 17, LT-10312, Vilnius, Lithuania

- **Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
- Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
- **Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.



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	Re	lease Control R	ecord		
Issue No.	Description			0	Date Issued
Issue No. RE171207E10I-3	Description Original release.				Pate Issued Apr. 15, 2019
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1 Certificate of Conformity

Product:BLACK-BeanBrand:8devicesTest Model:BLACK beanSample Status:R&D SAMPLEApplicant:UAB 8devicesTest Date:Jan. 17 to Apr. 17, 2017Standards:EN 301 893 V2.1.1 (2017-05)

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :	Phoenix Huang / Specialist	_, Date:	Apr. 15, 2019	
Approved by :	May Chen / Manager	_, Date:	Apr. 15, 2019	



2 Summary of Test Results

The EUT has been tested according to the following specifications:

	EN 301 893 V2.1.1					
Clause	Test Parameter	Result				
4.2.7	Adaptivity	Pass				
4.2.8	Receiver Blocking	Pass				



2.1 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSW8	101497	Aug. 11, 2016	Aug. 10, 2017
ESG Vector signal generator Agilent	E4438C	MY47271330 506 602 UNJ	Sep. 26, 2016	Sep. 25, 2017
Upgrade the software license on current E4438C ESG Agilent	E4438CK-403	ESG E4_010004	NA	NA
ESG Vector signal generator Agilent	E4438C	MY45094468/0 05 506 602 UK6 UNJ	Nov. 25, 2016	Nov. 24, 2017
Upgrade the software license on current E4438C ESG Agilent	E4438CK-403	ESG E4_010001	NA	NA
MXG X-Series RF Vector Signal Generator Agilent	N5182B	MY53052647	July 25, 2016	July 24, 2017
Direct Coupler EMCI	CS20-18-436/16	1139	NA	NA
Power Splitter/combiner Mini-Circuits	ZN4PD-642W-S +	408501327_0 3	Oct. 11, 2016	Oct. 10, 2017
Power Splitter/combiner Mini-Circuits	ZN4PD-642W-S +	408501327_0 4	Oct. 11, 2016	Oct. 10, 2017

NOTE: 1. The test was performed in Adaptivity room.

- 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 3. Tested Date: Jan. 17 to Apr. 17, 2017



2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

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

Parameter	Uncertainty
RF frequency	±1.132 ppm
RF power conducted	±1.207dB
RF power radiated	±4.925dB
Spurious emissions, conducted	±3dB
Spurious emissions, radiated	±4.925dB
Humidity	±5 %
Temperature	±0.6°C
Time	±5 %

2.3 Maximum Measurement Uncertainty

For the test methods, according to ETSI EN 301 893 standard, the measurement uncertainty figures shall be calculated and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in ETSI TR 100 028-1 and ETSI TR 100 028-2, in particular in annex D of the ETSI TR 100 028-2.

Maximum measurement uncertainty

Parameter	Uncertainty
RF frequency	±10 ppm
RF power conducted	±1,5 dB
RF power radiated	±6 dB
Spurious emissions, conducted	±3 dB
Spurious emissions, radiated	±6 dB
Humidity	±5 %
Temperature	±2 °C
Time	±10 %

2.4 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT (WLAN)

Product	BLACK-Bean				
Brand	8devices				
Test Model	BLACK bean				
Status of EUT	R&D SAMPLE				
Nominal Voltage	3.3Vdc from host equipment				
Voltage Operation Range	Vnom= 230Vac Vmin= 207Vac Vmax= 253Vac				
Temperature Operating Range	-10℃ ~70℃				
	CCK, DQPSK, DBPSK for DSSS				
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM				
	256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz				
Modulation Technology	DSSS, OFDM				
	802.11b: up to 11Mbps				
TransforDate	802.11a/g: up to 54Mbps				
Transfer Rate	802.11n : up to 150Mbps				
	802.11ac: up to 433.3Mbps				
	2.4GHz: 2412 ~ 2472MHz				
Operating Frequency 5GHz: 5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5700MHz					
	2.4GHz				
	802.11b/g, 802.11n (HT20), VHT20: 13				
	802.11n (HT40), VHT40: 9				
Number of Channel	5GHz				
	802.11a, 802.11n (HT20), 802.11ac (VHT20): 19				
	802.11n (HT40), 802.11ac (VHT40): 9				
	802.11ac (VHT80): 4				
EIRP Power	2.4GHz: 19.85dBm				
(Measured Max. Average)	5GHz: 22.21dBm				
Antenna Type	See item 3.2				
Antenna Connector	See item 3.2				
Accessory Device	NA				
Data Cable Supplied	NA				



Note:

- 1. This is a supplementary report of Report No: RE171207E10I-A-3. The differences between them are as below information:
 - Upgraded standard version to EN 301 893 V2.1.1.
- 2. According to above conditions, only Adaptive and Receiver Blocking of EN 301 893 V2.1.1 test item needs to be performed. And all data was verified to meet the requirements.
- 3. There are Bluetooth technology and WLAN technology used for the EUT.
- 4. The EUT incorporates a 1T1R function.

2.4GHz Band						
MODULATION MODE	DATA RATE (MCS)	TX & RX CON	FIGURATION			
802.11b	1 ~ 11Mbps	1TX	1RX			
802.11g	6 ~ 54Mbps	1TX	1RX			
802.11n (HT20)	MCS 0~7	1TX	1RX			
802.11n (HT40)	MCS 0~7	1TX	1RX			
VHT20	MCS 0~8, Nss=1	1TX	1RX			
VHT40	MCS 0~9, Nss=1 1TX		1RX			
	50	GHz Band				
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION				
802.11a	6 ~ 54Mbps	1TX	1RX			
802.11n (HT20)	MCS 0~7	1TX	1RX			
802.11n (HT40)	MCS 0~7	1TX	1RX			
802.11ac (VHT20)	MCS 0~8, Nss=1	1TX	1RX			
802.11ac (VHT40)	MCS 0~9, Nss=1	1TX	1RX			
802.11ac (VHT80)	MCS 0~9, Nss=1	1TX	1RX			

5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

- 6. WLAN/BT coexistence mode:
 - ◆ 1x1 WLAN + BT:
 - > 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
 - > 2.4GHz: timely shared coexistence.
- Spurious Emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
5 GHz (802.11a)	36 to 140	36	OFDM
+ Bluetooth (GFSK)	0 to 78	78	FHSS

8. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



3.2 Description of Antenna

Ant. No.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)													
						Band 1&2: 2.56		Band 1&2: 1.70															
	Main	WNC	81-EBJ15.005	PIFA	3.00	Band 3: 4.76	1.15	Band 3: 1.74	IPEX	300													
1						Band 4: 4.76		Band 4: 1.79															
							Band 1&2: 3.08		Band 1&2: 1.70)													
	Aux	WNC	81-EBJ15.005	PIFA	3.62	Band 3: 3.31	1.15	Band 3: 1.74	IPEX	300													
																			Band 4: 2.42		Band 4: 1.79		
						Band 1&2: 5.56		Band 1&2: 1.29															
	Main	WNC	81.ED415.001	PIFA	0.22	Band 3: 5.03	0.96	Band 3: 1.36	IPEX	300													
2						Band 4: 3.14		Band 4: 1.38															
2							Band 1&2: 5.17		Band 1&2: 1.29														
	Aux	WNC	81.ED415.001	PIFA	1.48	Band 3: 5.34	0.96	Band 3: 1.36	IPEX	300													
						Band 4: 2.93		Band 4: 1.38															

The antenna gain was declared by client; please refer to the following table:

Note: 1. Above antenna gains of antenna are Total (H+V).



3.3 Description of Test Modes

FOR 5180 ~ 5320MHz

8 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	52	5260
40	5200	56	5280
44	5220	60	5300
48	5240	64	5320

4 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	54	5270
46	5230	62	5310

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210 MHz	58	5290 MHz

FOR 5500 ~ 5700MHz

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610



3.3.1 Test Mode Applicability and Tested Channel Detail

EUT Configure	Applicable to		Description
Mode	AD	RB	Description
-			-

Where

AD: Adaptivity (Channel Access Mechanism)

RB: Receiver Blocking

Adaptivity Test:

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology
802.11ac (VHT20)	36 to 64	10	OFDM
002.11ac (VH120)	100 to 140	40	OFDIM
902 11 cc (\/\.\.T.10)	38 to 62	38	OFDM
802.11ac (VHT40)	102 ot 134		

Receiver Blocking Test:

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
802 11 -	36 to 64	36	OFDM	6
802.11a	100 to 140	100	OFDM	6

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
AD	25deg. C, 60%RH	230Vac, 50Hz	Denny Liu
RB	23deg. C, 62%RH	230Vac, 50Hz	Allen Chuang



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standard:

EN 301 893 V2.1.1 (2017-05)

All test items have been performed and recorded as per the above standard.



4 Test Procedure and Results

4.1 Adaptivity

4.1.1 Product information for Adaptivity (Channel Access Mechanism)

	Adaptivity (Channel Access Mechanism)
Frame Based Equipment	The Frame Based Equipment equipment operates as an Initiating Device
	The Frame Based Equipment equipment operates as an Responding Device
	The Frame Based Equipment equipment can operate as an Initiating Device and as a Responding Device
⊠Load Based Equipment	The Load Based Equipment equipment operates as a Supervising Device
	☐ The Load Based Equipment equipment operates as a Supervised Device
	The Load Based Equipment equipment can operate as a Supervising and as a Supervised Device

Priority Classes implemented by the Load Based Equipment		
	Priority Class 4 (Highest priority)	
Operating as a	Priority Class 3	
Supervising Device	Priority Class 2 Note 1 Note 2	
	Priority Class 1 (Lowest priority) Note 1	
⊠Operating as a Supervised Device	Priority Class 4 (Highest priority)	
	Priority Class 3	
	Priority Class 2 D Note 1 Note 2	
	Priority Class 1 (Lowest priority) Note 1	

Energy Detection Threshold Level(TL)		
Frame Based Equipment	For P _H ≤ 13 dBm : TL = -75 dBm/MHz For 13 dBm < P _H < 23 dBm : TL = -85 dBm/MHz + (23 dBm - P _H)	
	For $P_H \ge 23 \text{ dBm}$: TL = -85 dBm/MHz	
	(assumes a 0 dBi receive antenna and P _H to be specified in dBm e.i.r.p)	
	☑ Option 1: TL = -75 dBm/MHz (assumes a 0 dBi receive antenna)	
⊠Load Based Equipment	□ Option 2: For $P_H \le 13 \text{ dBm}$: TL = -75 dBm/MHz For 13 dBm < $P_H < 23 \text{ dBm}$: TL = -85 dBm/MHz + (23 dBm - P_H)	
	For P _H ≥ 23 dBm : TL = -85 dBm/MHz	
	(assumes a 0 dBi receive antenna and P _H to be specified in dBm e.i.r.p)	



4.1.2 Requirements and Limits of Adaptive

Channel Access Mechanism			
Requirement Frame Based Equipment		Load Based Equipment	
Minimum Clear Channel Assessment (CCA) Time	9 µs	9 µs	
Maximum Channel Occupancy (COT) Time	95 % of the Fixed Frame Period (Note 1)	2 ~ 10 ms(see table 1 & 2)	
Minimum Idle Period	5% COT, with a min of 100 μs	25µs	
Extended CCA check	NA	NA	
Short Control Signalling Transmissions	Maximum duty cycle of 5 % within an observation period of 50 ms		
Note 1: The Fixed Frame Periods supported by the equipment shall be declared by the manufacturer and shall be within the range of 1 ms to 10 ms.			

Table 1: Priority Class dependent Channel Access parameters for Supervising Devices

Class #	p ₀	CW _{min}	CW _{max}	maximum Channel Occupancy Time (COT)
4	1	3	7	2 ms
3	1	7	15	4 ms
2	3	15	63	6 ms (see note 1 and note 2)
1	7	15	1 023	6 ms (see note 1)
 NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 µs. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time. NOTE 2: The maximum Channel Occupancy Time (COT) of 6 ms may be increased to 10 ms by extending CW to CW x 2 + 1 when selecting the random number q for any backoff(s) that precede the Channel Occupancy that may exceed 6 ms or which follow the Channel Occupancy that exceeded 6 ms. The choice between preceding or following a Channel Occupancy shall remain unchanged during the operation time of the device. 				
NOTE 3: The values for p_0 , CW _{min} , CW _{max} are minimum values. Greater values are allowed.				

Table 2: Priority Class dependent Channel Access parameters for Supervised Devices

Class #	po	CW _{min}	CW _{max}	Maximum Channel Occupancy Time (COT)
4	2	3	7	2 ms
3	2	7	15	4 ms
2	3	15	1 023	6 ms (see note 1)
1	7	15	1 023	6 ms (see note 1)
 NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 μs. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time. NOTE 2: The values for p₀, CW_{min}, CW_{max} are minimum values. Greater values are allowed. 				



Class #	Idle Periods Classification		
4	$B_n = \begin{cases} [0, 23[\ \mu s, & n = 0\\ [23 + 9 \times (n - 1), 23 + 9 \times n[\ \mu s, & 1 \le n \le 3\\ [50, \infty[\ \mu s, & n = 4 \end{cases}$		
3	$B_n = \begin{cases} [0, 23[\ \mu s, & n = 0 \\ [23 + 9 \times (n - 1), 23 + 9 \times n[\ \mu s, & 1 \le n \le 7 \\ [86, \infty[\ \mu s, & n = 8 \end{cases} \end{cases}$		
2	$B_n = \begin{cases} [0, 41[\ \mu s, \ n = 0 \\ [41 + 9 \times (n - 1), 41 + 9 \times n[\ \mu s, \ 1 \le n \le 31 \\ [320, \infty[\ \mu s, \ n = 32 \\ [0, 41[\ \mu s, \ n = 0 \\ B_n = \begin{cases} [41 + 9 \times (n - 1), 41 + 9 \times n[\ \mu s, \ 1 \le n \le 15 \\ [176, \infty[\ \mu s, \ n = 16 \\ \end{bmatrix} \text{ (not use of note 2 in table 1)} \end{cases}$		
1	$B_n = \begin{cases} [0, 77[\ \mu s, \ n = 0] \\ [77 + 9 \times (n - 1), 77 + 9 \times n[\ \mu s, \ 1 \le n \le 15] \\ [212, \infty[\ \mu s, \ n = 16] \end{cases}$		

Table 3: Classification of Idle Periods dependent Priority Class for Supervising Devices

Table 4: Classification of Idle Periods	dependent Priority Class for Supervised Devices
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Class #	Idle Periods Classification		
4	$B_n = \begin{cases} [0, 32[\ \mu s, & n = 0\\ [32 + 9 \times (n - 1), 32 + 9 \times n[\ \mu s, & 1 \le n \le 3\\ [59, \infty[\ \mu s, & n = 4 \end{cases}$		
3	$B_n = \begin{cases} [0, 32[\ \mu s, & n = 0 \\ [32 + 9 \times (n - 1), 32 + 9 \times n[\ \mu s, & 1 \le n \le 7 \\ [95, \infty[\ \mu s, & n = 8 \end{cases} \end{cases}$		
2	$B_n = \begin{cases} [0, 41[\ \mu s, & n = 0 \\ [41+9 \times (n-1), 41+9 \times n[\ \mu s, & 1 \le n \le 15 \\ [176, \infty[\ \mu s, & n = 16 \end{cases}$		
1	$B_n = \begin{cases} [0, 77[\ \mu s, & n = 0 \\ [77 + 9 \times (n - 1), 77 + 9 \times n[\ \mu s, & 1 \le n \le 15 \\ [212, \infty[\ \mu s, & n = 16 \end{cases}$		



Class #	Idle Periods probability		
4	$p(n) \le \begin{cases} 0,05, & n = 0\\ 0,05 + n \times 0,25, & 1 \le n \le 3\\ 1 & n \ge 3 \end{cases}$		
3	$p(n) \leq \begin{cases} 0,05, & n = 0\\ 0,18, & n = 1\\ 0,18 + (n-1) \times 0,125, & 2 \le n \le 6\\ 1, & n > 6 \end{cases}$		
2	$p(n) \leq \begin{cases} 0,05 + n \times 0,25, & 1 \leq n \leq 3 \\ 1, & n > 3 \end{cases}$ $p(n) \leq \begin{cases} 0,05, & n = 0 \\ 0,18, & n = 1 \\ 0,18 + (n-1) \times 0,125, & 2 \leq n \leq 6 \\ 1, & n > 6 \end{cases}$ $p(n) \leq \begin{cases} 0,05, & n = 0 \\ 0,12, & n = 1 \\ 0,12 + (n-1) \times 0,03125, & 2 \leq n \leq 29 \\ 1, & n > 29 \end{cases}$ (use of note 2 in table 1) $1, & n > 29 \\ 0,05, & n = 0 \\ 0,12, & n = 1 \\ 0,12 + (n-1) \times 0,0625, & 2 \leq n \leq 15 \\ 0,05, & n = 0 \\ 0,12 + (n-1) \times 0,0625, & 2 \leq n \leq 15 \\ 1, & n > 15 \\ 0,05, & n = 0 \\ 0,09 + (n-1) \times 0,03125, & 1 \leq n \leq 7 \\ 0,59 + (n-1) \times 0,03125, & 8 \leq n \leq 14 \\ 1, & n > 14 \end{cases}$ (use of note 1 in table 1 & table 2) $p(n) \leq \begin{cases} 0,09 + (n-1) \times 0,03125, & 1 \leq n \leq 7 \\ 0,59 + (n-1) \times 0,03125, & 8 \leq n \leq 14 \\ 1, & n > 14 \end{cases}$		
1	$p(n) \leq \begin{cases} 0,05 + (n-1) \times 0,05125, 0 \le n \le 11 \\ 1, n > 14 \\ p(n) \leq \begin{cases} 0,05, n = 0 \\ 0,12, n = 1 \\ 0,12 + (n-1) \times 0,0625, 2 \le n \le 15 \\ 1, n > 15 \\ 1 \\ n > 15 \end{cases}$ Il number of Idle Periods observed. Then E is the sum of events in all bins:		
E define the total number of Idle Periods observed. Then E is the sum of events in all bins: $E = \sum_{n=0}^{k} H(B_n)$			
	probability that idle periods of duration less than the upper limit specified for bin B _n p (Idle Period < upper limit of bin B _n) $p(n) = \frac{\sum_{i=0}^{n} H(B_i)}{E}$		



4.1.3 Test Procedure

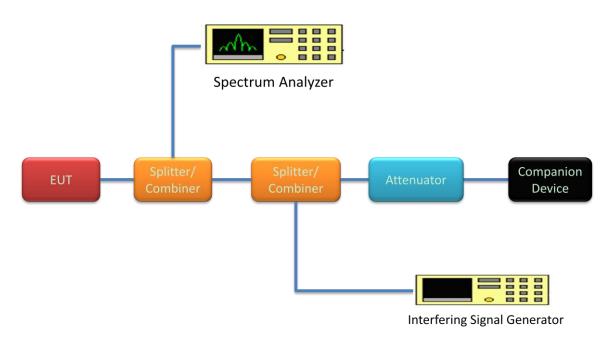
Refer to EN 301 893 V2.1.1 clause 5.4.9

Measurement Method			
Conducted measurement	Radiated measurement		

4.1.4 Deviation from Test Standard

No deviation.

4.1.5 Test Setup Configuration



UUT Software and Firmware Version

Product	Model No.	Software/Firmware Version
		4/14/2017
DLACK-Bean	BLACK-Bean BLACK bean	12.0.0.995

Companion Device information

Product	Brand	Model No.	Software/Firmware Version
Wireless AC Module	ALPHA	WMC-AC01	1.0.0 Mon 04 Feb 2013

Note: This module WMC-AC01 was installed in the DIR-868LAP.



4.1.6 List of Measurements

Clause	Test Parameter	Remarks	Pass/Fail
4.2.7.3.1	Adaptive (Frame Based Equipment)	Not Applicable	NA
4.2.7.3.2	Adaptive (Load Based Equipment)	Applicable	Pass
4.2.7.3.3	Short Control Signalling Transmissions	Applicable	Pass



4.1.7 Interference Signals used for Adaptivity tests Energy Detection Threshold Level(TL) Option 1: TL = -75 dBm/MHz (assumes a 0 dBi receive antenna) UUT antenna Gain(G) : 0 dBi \boxtimes at the antenna connector The ED Threshold level (TL) = -75 dBm/MHz + G (0dBi) = -75 dBm/MHz in front of the antenna Additive White Gaussian Noise (AWGN) test signal)dBm ● **RBW** 1 MHz 0 dB ● **SWT** 1 s ● **VBW** 3 MHz **Mode** Auto Sweep SGL Ref Level -20.00 Att 0 c I Frequency Sweep O1Rm Clrw -75.04 dBm 5.20851390 GHz M1[1] M1 CF 5.2 GHz 2.0 MHz/ Span 20.0 MHz 8001 pts Ref Level -68.00 dBm © RBW 300 kHz ● Att 0 dB SWT 1.01 ms © VBW 1 MHz Mode Auto Sweep Count 100/100 01Pk Avg -74.96 dBm 5.1960920 GHz -72.96 dBm 1 Occupied Bandwidth M2[1] M1[1] 5.1931270 GHz Minghan Anger service and for the south of t CF 5.2 GHz 1001 pts 4.0 MHz/ Span 40.0 MHz 2 Marker Table Y-Value -72.96 dBm Function Trc X-Value 5.193127 GHz Function Result Туре Ref M1 T1 19.98001998 MHz 19001 GHz dBm 5.20999 GHz 5.196092 GHz dBm -79.09 dBm -**74.96 dBm**



				OFDM te	st signal				
Ref Level -20 Att		● RBW 1 「1s● VBW 3	MHz MHz Mode Aut	o Sweep					SG
Frequency S	weep								•1Rm Clrv
								M1[1] 5.	-75.23 df 20764900 G
0 dBran	gat go jago jago jaga shi shu da a shi ya shi sa shi ya sh	adapadipatipi biyang tarakan na mangang sa		a da fan fan ski yn red wed wed i er fan sjer sjer sjer	fan Djoerlân stjoerline, het stear het y slat blen	ner v det dela region filoso per estre esta esta esta esta esta esta esta est	ak ny sela ata ing dan ga ak ing kang kang kang kang kang baga ben ny ben y		
and the second se									
F 5.2 GHz			8001 pt	3		2.0 MHz/			Span 20.0 Mi

RefLevel-20.00 dBm Att 0 dB = SWT :	● RBW 1 MHz 1 s ● VBW 3 MHz Mode A	Auto Swoon		S
Frequency Sweep	IS S VBW SMITZ Mode /	Auto Sweep		•1Rm Cl
				M1[1] -75.22 5.20195230
) degeneration	<u>Augura ya ya kata kata kata ak</u> a aka aka aka aka aka aka aka aka a	*****		
i dBm				
10 dBm				
5.2 GHz	8001	pts	2.0 MHz/	Span 20.0 N



4.1.8 Test Result

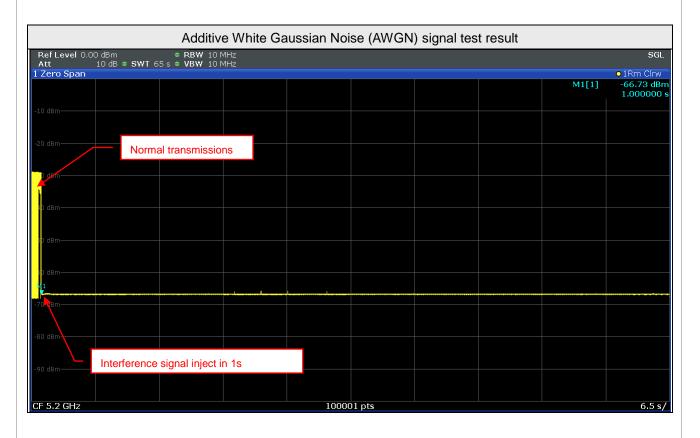
4.1.8.1 Adaptive Test Result

Channel Opreation of EUT Device type

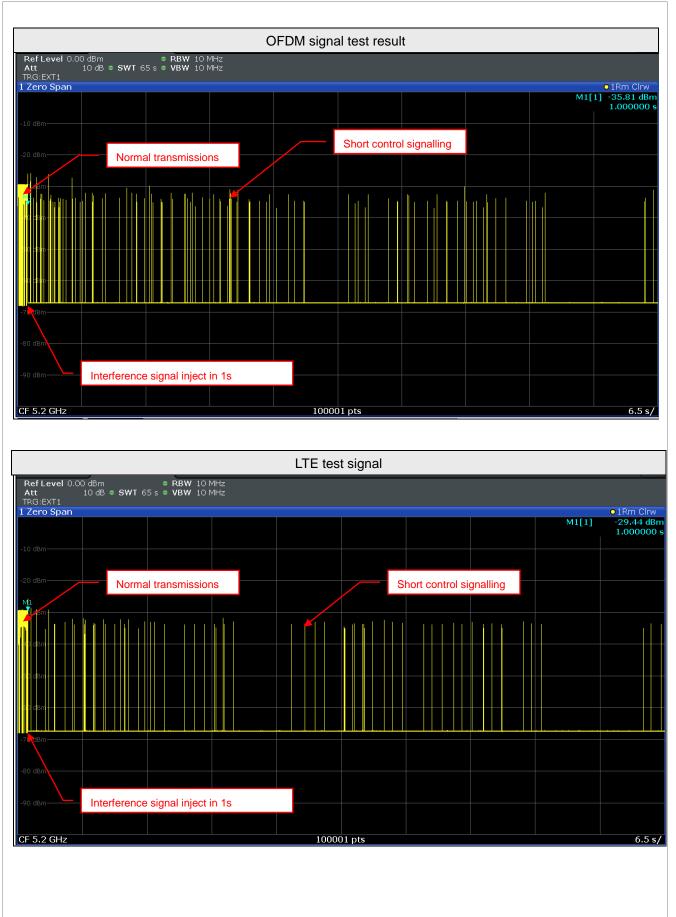
Frame Based Equipment	Single Channel Operation
	Multi-Channel Opreation
	Single Channel Operation
Load Based Equipment	Option 1 for Multi-Channel Opreation
	Option 2 for Multi-Channel Opreation

Operating Frequency Bands and Mode of EUT

Operational Mode	Operating Frequency (MHz)	Test Result	
802.11ac (VHT20)	5200	Pass	









Operational Mode	Operating F (MH:		Test Res		
802.11ac (VHT40)	519	0		Pass	
احله ۵			toot rooult		
Ref Level 0.00 dBm = RBW 10	tive White Gaussian N	oise (AwGN) signal	lest result	_	SGL
Att 10 dB = SWT 65 s = VBW 10 1 Zero Span					• 1Rm Clrw
10.49m				M1[1]	-67.18 dBm 1.000000 s
Normal transmis					
Normal transmis	sions				
i dem-					
e dêm-					
-70 8m					
-80 d8/h					
Interference signal inje	ct in 1s				
CF 5.2 GHz	10000	1 pts			6.5 s/



4.1.8.2 Test results of Channel Access Mechanism

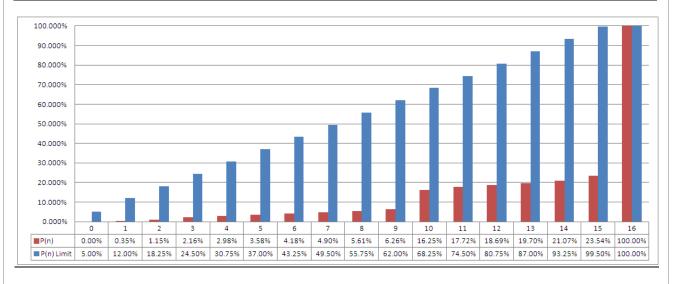
Channel Access Mechanism of EUT type

Frame Based Equipment						
Load Based Equipment	Option A : verify channel access mechanism					
	Option B : declatation by manufacturer					

Operating Frequency Bands and Mode of EUT

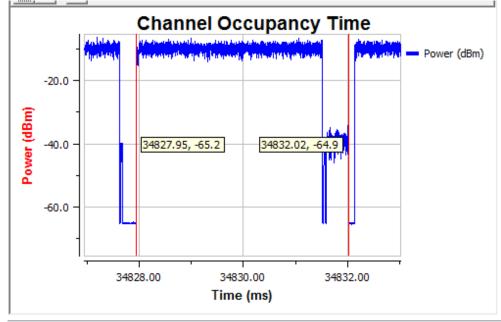
Operational Mode	Operating Frequency (MHz)	Maximum Channel Occupancy Time (ms)	Minimum Idle Period (µs)	Test Result
802.11ac (VHT40)	5190	4.063	27	Pass

Total Idle No	11087		Idle probility	Limit	Result
B[0]	0	P[0]	0.00%	5.00%	Pass
B[1]	39	P[1]	0.35%	12.00%	Pass
B[2]	88	P[2]	1.15%	18.25%	Pass
B[3]	112	P[3]	2.16%	24.50%	Pass
B[4]	91	P[4]	2.98%	30.75%	Pass
B[5]	67	P[5]	3.58%	37.00%	Pass
B[6]	66	P[6]	4.18%	43.25%	Pass
B[7]	80	P[7]	4.90%	49.50%	Pass
B[8]	79	P[8]	5.61%	55.75%	Pass
B[9]	72	P[9]	6.26%	62.00%	Pass
B[10]	1107	P[10]	16.25%	68.25%	Pass
B[11]	163	P[11]	17.72%	74.50%	Pass
B[12]	108	P[12]	18.69%	80.75%	Pass
B[13]	112	P[13]	19.70%	87.00%	Pass
B[14]	152	P[14]	21.07%	93.25%	Pass
B[15]	274	P[15]	23.54%	99.50%	Pass
B[16]	8477	P[16]	100.00%	100.00%	Pass





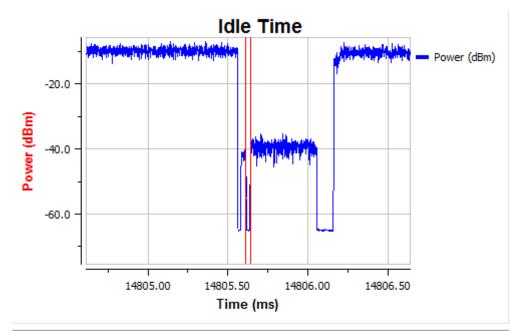
Maximum Channel Occupancy Time



Channel Occupency Information

Maximum COT (ms): 4.063

Minimum Idle Period



Channel Occupency Information -

Minimum Idle Time (us) : 27



4.1.8.3 Short Control Signalling Transmissions Result

802.11ac (VHT20) mode CH40 5200MHz

Short Control Signalling Transmission Result									
Interference signal	SCST total on time (ms)	SCST Limit (ms)	PASS/FAIL						
AWGN signal	0	2.5	PASS						
OFDM signal	0.29	2.5	PASS						
LTE signal	0.36	2.5	PASS						

					OFDM sign	al test resu	ılt			
Ref Level 0.0 Att TRG:VID		WT 50	● RBW Ims ● VBW							SGL
1 Zero Span										01Rm Clrw
									D2[1]	0.11 dB 73.000 µs
-10 dBm									M1[1]	-68.47 dBm 7.780000 ms
-20 dBm										
-30 dBm										
-40 dBm) dBm								
-50 dBm										
-60 dBm										
	and film in densities			in the second	eester werden dijk op de ferende tijne bester de die geween die dijk op de dijk op de die die die die die die d	le <mark>tte ellen syndigen in tite er len d</mark> en den sit	ulter log verskt here et de sint here here	and a support of the last of the second s	angan dalam terdistika dan di kangan dan dan di kangan dalam dan dan di kangan dan dan dan dan dan dan dan dan T	
-80 dBm-	a por appoint		sense in the production of the sense of the se	(angle) - data galani	a la printe de la constate presentate presentate presentate de la constate de la constate de la constate de la	a teljska siddi _{da k} astilik di dokurikan		nda <mark>han dila di sekarah dela di s</mark> ekarah di sekarah di sekarah di sekarah di sekarah di sekarah di sekarah di s	and, lipid, il, aine e più libidia dai	indirense se s
-90 dBm										
CF 5.2 GHz					1.000	01 pts				5.0 ms/
2 Marker Tab	le				1000	01 p 00				010 1137
Type Re M1	f Trc		X-Value 7.78 ms		Y-Value -68.47 dBm	Fund	ction	Fu	nction Result	
D2 M1			73.0 µs		0.11 dB					



			I	LTE signal	test result				
Ref Level 0.00 Att TRG:VID		● RBW 10 50 ms ● VBW 10							
1 Zero Span									01Rm Clrw
								D2[1]	0.11 dB
								M1[1]	60.000 µs -69.88 dBm
-10 dBm								WIT[1]	1.079000 ms
-20 dBm	1.1.	1							
-30 dBm									
-40 dBm	TRC 40.000 dom								
	TRG -42.000 UBIII								
-50 dBm									
-60 dBm									
Report Heli Joseph Royde	والمراجع والمرجع المرجع والمرجع والمرجع	and here the section of the section	ويواسط المرجعة والالوراد فعرار ومراجع	وفأور ومناز التأويل الأتأ إسارت العري	ويتربك والقصية ومنارعه المتلاقية	and a second state of the	وراويل مل ويلين والعلم ويتله ومرت	المحاوز فالبر وبرأ وأبال ويلافع المروف وتقرير	the children of the standard free when when
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includes detailed in a should	weeten keren keren keren bereiten bereiten bereiten bereiten bereiten bereiten bereiten bereiten bereiten bereit	فالمايية أوالتنا ويتجربهما الأوإدري	فالأطرار إطراب فارعاؤها ألقا الطاسط	n <mark>n ha suite sei sui s</mark> uite suite s	<mark>n isaan da sa kana da sa kana sa sa</mark>	in the second states of the second states of the second second second second second second second second second	n para ang para ang panang pang pang pang pang pang pa	in di padalan padalan ku bi	i kata ang panganan paku
-80 dBm							·	•	I
-80 UBII									
-90 dBm									
CF 5.2 GHz				1000	01 pts				5.0 ms/
2 Marker Tabl	e								
Type Ref		X-Value		Y-Value	Fund	tion	Fu	nction Result	
M1 D2 M1		1.079 ms 60.0 µs	-0	59.88 dBm 0.11 dB					
	1	00.0 µs		U.II UD					

802.11ac (VHT40) mode CH38 5190MHz

Short Control Signalling Transmission Result									
Interference signal	SCST total on time (ms)	SCST Limit (ms)	PASS/FAIL						
AWGN signal	0	2.5	PASS						



4.2 Receiver Blocking

4.2.1 Limit of Receiver Blocking

This requirement applies to all receiver categories.

Receiver Blocking Criterion		
Minimum performance	$\square PER \leq 10\%$	
	Alternative performance criteria (See note)	
Note: The manufacturer was declared performance criteria is x% for the intended use of the equipment.		

Receiver Blocking Parameters				
Wanted signal mean power from	from Frequency (MHz)	Blocking Signal Power (dBm) (See note 2)		Type of blocking
companion device (dBm)		Master or Slave with radar detection (see note 3)	Slave without radar detection (see note 3)	signal
P _{min} + 6 dB	5100	-53	-59	Continuous Wave
P _{min} + 6 dB	4900 5000 5975	-47	-53	Continuous Wave
NOTE 1: P _{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum				
 performance criteria as defined in clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain. NOTE 3: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection unless these devices are used in fixed outdoor point to point or fixed outdoor point to multipoint applications 				

4.2.2 Test Procedure

Refer to EN 301 893 V2.1.1 clause 5.4.10

Measurement Method			
Conducted measurement	Radiated measurement		

4.2.3 Deviation from Test Standard

No deviation.



4.2.4 Test Setup Configuration Spectrum Analyzer Companion Attenuator Attenuator Coupler Device Performance Monitor Device **Blocking Signal Generator**



4.2.5 Test Results

Receiver blocking performance when operating at the lower sub-band						
	P _{min} : -85dBm					
The actual blocking signal power(Note1)			at the antenna connector			
				in front of the antenna		
Note1: For the conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.						
Operation Mode	Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	The actual blocking signal power (dBm)	Pass/Fail	
			5100	-59	Pass	
802.11a	36	36 -79	4900	-53	Pass	
			5000	-53	Pass	
			5975	-53	Pass	

Receiver blocking performance when operating at the higher sub-band					
	P _{min} : -87dBm				
The actual blocking signal power(Note1)			☑ at the antenna connector		
			in front of the antenna		
Note1: For the conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.					
Operation Mode	Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	The actual blocking signal power (dBm)	Pass/Fail
		· · ·	5100	-59	Pass
902 110	100	-81	4900	-53	Pass
802.11a	100	-81	5000	-53	Pass
			5975	-53	Pass



Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF/Telecom Lab Tel: 886-3-6668565 Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

The address and road map of all our labs can be found in our web site also.

--- END ----



Appendix A– Original Report No.: RE171207E10I-A-3



EN 301 893 RF Test Report (WLAN)

Report No.: RE171207E10I-A-3

Test Model: BLACK-Bean

Received Date: Oct. 08, 2014

Test Date: Oct. 16 to Nov. 07, 2014 ; July 23 to Aug. 04, 2016

Issued Date: Apr. 15, 2019

Applicant: UAB 8devices

Address: Antakalnio 17, LT-10312, Vilnius, Lithuania

- **Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
- Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
- **Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specification, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Report No.: RE171207E10I-A-3 Reference No.: 190103E01



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Release Control Record		
ssue No.	Description	Date Issued
RE171207E10I-A-3	Original release.	Apr. 15, 2019



1 Certificate of Conformity

Product:BLACK-BeanBrand:8devicesTest Model:BLACK-BeanSample Status:R&D SAMPLEApplicant:UAB 8devicesTest Date:Oct. 16 to Nov. 07, 2014 ; July 23 to Aug. 04, 2016Standards:EN 301 893 V1.8.1 (2015-03)

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :	Phoenix Huang / Specialist	, Date:	Apr. 15, 2019	
Approved by :	May Chen / Manager	, Date:	Apr. 15, 2019	



2 Summary of Test Results

The EUT has been tested according to the following specifications:

EN 301 893 V1.8.1				
Clause	Test Parameter	Result		
	Transmitter Parameters			
4.2	Carrier Frequencies	Pass		
4.3	Occupied Channel Bandwidth	Pass		
4.4	RF Output Power	Pass		
4.4	Transmit Power Control (TPC)	Pass		
4.4	Power Density	Pass		
4.8	Adaptivity (Channel Access Mechanism)	Pass		
4.9	User Access Restrictions	Pass		
4.5.1	Transmitter unwanted emissions outside the 5GHz RLAN bands	Pass		
4.5.2	Transmitter unwanted emissions within the 5GHz RLAN bands	Pass		
4.7	Dynamic Frequency Selection	See Note 1		
4.10	Geo-location capability	Not Applicable		
	Receiver Parameters			
4.6	Spurious Emissions	Pass		

Note: 1. The "Dynamic Frequency Selection" was recorded in another test report.

••



2.1 Test Instruments

For spurious emissions test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2016	July 22, 2017
Pre_Amplifier Agilent	8447D	2944A10626	Feb. 21, 2016	Feb. 20, 2017
Pre_Amplifier HP	8449B	3008A01281	Jan. 16, 2016	Jan. 15, 2017
Pre_Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
TRILOG Antenna SCHWARZBECK	VULB9168	9168-162	Jan. 20, 2016	Jan. 19, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D1	D124	Jan. 20, 2016	Jan. 19, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Jan. 19, 2016	Jan. 18, 2017
Software	ADT_Radiated _V7.6.15.9.4	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208411	NA	NA
Power meter Anritsu	ML2495A	0824006	May 26, 2016	May 25, 2017
Power sensor Anritsu	MA2411B	0738172	May 26, 2016	May 25, 2017
ESG Vector signal generator Agilent	E4438C	Y45094468/00 5 506 602 UK6 UNJ	Dec. 01, 2015	Nov. 30, 2016

NOTE: 1. The test was performed in RF Fully Chamber No. 1.

- 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 3. Tested Date: July 23 to 26, 2016



For Adaptivity test:				
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSW8	101497	Aug. 07, 2015	Aug. 06, 2016
ESG Vector signal generator Agilent	E4438C	MY45094468/0 05 506 602 UK6 UNJ	Dec. 01, 2015	Nov. 30, 2016
Upgrade the software license on current E4438C ESG Agilent	E4438CK-403	ESG E4_010001	NA	NA
MXG X-Series RF Vector Signal Generator Agilent	N5182B	MY53051263	Aug. 10, 2015	Aug. 09, 2016

NOTE: 1. The test was performed in Adaptivity room.

- 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 3. Tested Date: Aug. 04, 2016



or other test items:				
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100060	May 08, 2014	May 07, 2015
AC Power Source EXTECH Electronics	6502	1140503	NA	NA
Temperature & Humidity Chamber TERCHY	MHU-225AU	911033	Dec. 09, 2013	Dec. 08, 2014
DC Power Supply GOOD WILL INSTRUMENT CO., LTD.	GPC - 3030D	7700087	NA	NA
ESG Vector signal generator Agilent	E4438C	MY47271330 506 602 UNJ	Apr. 28, 2014	Apr. 27, 2015
Upgrade the software license on current E4438C ESG Agilent	E4438CK-403	ESG E4_010004	NA	NA
ESG Vector signal generator Agilent	E4438C	MY45094468/0 05 506 602 UK6 UNJ	Dec. 06, 2013	Dec. 05, 2014
Upgrade the software license on current E4438C ESG Agilent	E4438CK-403	ESG E4_010001	NA	NA
Power meter Anritsu	ML2495A	0824006	May 22, 2014	May 21, 2015
Power sensor Anritsu	MA2411B	0738172	May 22, 2014	May 21, 2015
Software	Total Power Measurement Tools V7.1	NA	NA	NA
Software	ADT_RF Test Software V6.6.5.3	NA	NA	NA

NOTE: 1. The test was performed in Oven room A.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3. Tested Date: Oct. 16 to Nov. 07, 2014



2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

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

Parameter	Uncertainty
RF frequency	±1.132x10 ⁻⁶
RF power conducted	±1.207dB
RF power radiated	±4.925dB
Spurious emissions, conducted	±3dB
Spurious emissions, radiated	±4.925dB
Humidity	±5 %
Temperature	±0.6°C
Time	±5 %

2.3 Maximum Measurement Uncertainty

For the test methods, according to ETSI EN 301 893 standard, the measurement uncertainty figures shall be calculated in accordance with ETSI TR 100 028-1 [2] and ETSI TR 100 028-2 [3] and shall correspond to an expansion factor (coverage factor) k = 1.96 or k = 2 (which provide confidence levels of respectively 95 % and 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Maximum measurement uncertainty

Parameter	Uncertainty
Radio frequency	±1 x 10 ⁻⁵
RF power conducted	±1.5 dB
RF power radiated	±6 dB
Spurious emissions	±6 dB
Humidity	±5 %
Temperature	±1 °C
Time	±10 %

2.4 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT (WLAN)

Product	BLACK-Bean	
Brand	8devices	
Test Model	QCNFA435	
Status of EUT	R&D SAMPLE	
Nominal Voltage	3.3Vdc from host equipment	
Temperature Operating	-10℃ ~70℃	
Range	CCK, DQPSK, DBPSK for DSSS	
Madulation Truca		
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM	
	256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz	
Modulation Technology	DSSS, OFDM	
	802.11b: up to 11Mbps	
Transfer Rate	802.11a/g: up to 54Mbps	
	802.11n : up to 150Mbps	
	802.11ac: up to 433.3Mbps	
Operating Frequency	2.4GHz: 2412 ~ 2472MHz	
operating rrequeries	5GHz: 5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5700MHz	
	2.4GHz	
	802.11b/g, 802.11n (HT20), VHT20: 13	
	802.11n (HT40), VHT40: 9	
Number of Channel	5GHz	
	802.11a, 802.11n (HT20) , 802.11ac (VHT20): 19	
	802.11n (HT40) , 802.11ac (VHT40): 9	
	802.11ac (VHT80): 4	
	non-adaptive Equipment	
Adaptive/Non-Adaptive	☑ adaptive Equipment without the possibility to switch to a non-adaptive	
Auaplive/Non-Auaplive	mode	
	adaptive Equipment which can also operate in a non-adaptive mode	
	2.4GHz: 19.85dBm	
	5GHz:	
EIRP Power	5150 MHz ~ 5250MHz : 22.21dBm	
(Measured Max. Average)	5250 MHz ~ 5350MHz : 21.64dBm	
	5470 MHz ~ 5725 MHz : 22.15dBm	
Antenna Type	See item 3.2	
Antenna Connector	See item 3.2	
Accessory Device	NA	
Data Cable Supplied	NA	



Note:

- 1. There are Bluetooth technology and WLAN technology used for the EUT.
- 2. The EUT incorporates a 1T1R function.

2.4GHz Band					
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION			
802.11b	1 ~ 11Mbps	1TX	1RX		
802.11g	6 ~ 54Mbps	1TX	1RX		
802.11n (HT20)	MCS 0~7	1TX	1RX		
802.11n (HT40)	MCS 0~7	1TX	1RX		
VHT20	MCS 0~8, Nss=1	1TX	1RX		
VHT40	MCS 0~9, Nss=1	1TX	1RX		
	5GHz Band				
MODULATION MODE	DATA RATE (MCS)	TX & RX CON	IFIGURATION		
802.11a	6 ~ 54Mbps	1TX	1RX		
802.11n (HT20)	MCS 0~7	1TX	1RX		
802.11n (HT40)	MCS 0~7	1TX	1RX		
802.11ac (VHT20)	MCS 0~8, Nss=1	1TX	1RX		
802.11ac (VHT40)	MCS 0~9, Nss=1	1TX	1RX		
802.11ac (VHT80)	MCS 0~9, Nss=1	1TX	1RX		
Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode					

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report.

3. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

- 4. WLAN/BT coexistence mode:
 - ◆ 1x1 WLAN + BT:
 - > 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
 - > 2.4GHz: timely shared coexistence.
- Spurious Emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
5 GHz (802.11a)	36 to 140	36	OFDM
+ Bluetooth (GFSK)	0 to 78	78	FHSS

6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



3.2 Description of Antenna

Ant No		Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
						Band 1&2: 2.56		Band 1&2: 1.70		
	Main	WNC	81-EBJ15.005	PIFA	3.00	Band 3: 4.76	1.15	Band 3: 1.74	IPEX	300
1						Band 4: 4.76		Band 4: 1.79		
'						Band 1&2: 3.08		Band 1&2: 1.70		
	Aux	WNC	81-EBJ15.005	PIFA	3.62	Band 3: 3.31	1.15	Band 3: 1.74	IPEX	300
						Band 4: 2.42		Band 4: 1.79		
						Band 1&2: 5.56		Band 1&2: 1.29		
	Main	WNC	81.ED415.001	PIFA	0.22	Band 3: 5.03	0.96	Band 3: 1.36	IPEX	300
2						Band 4: 3.14		Band 4: 1.38		
2						Band 1&2: 5.17		Band 1&2: 1.29		
	Aux	WNC	81.ED415.001	PIFA	1.48	Band 3: 5.34	0.96	Band 3: 1.36	IPEX	300
						Band 4: 2.93		Band 4: 1.38		

The antenna gain was declared by client; please refer to the following table:

Note: 1. Above antenna gains of antenna are Total (H+V).



3.3 Description of Test Modes

FOR 5180 ~ 5320MHz

8 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	52	5260
40	5200	56	5280
44	5220	60	5300
48	5240	64	5320

4 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	54	5270
46	5230	62	5310

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210 MHz	58	5290 MHz

FOR 5500 ~ 5700MHz

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610



3.4 Output Power with Variable Antennas under Normal Environmental Conditions

3.4.1 Output Powers with the Highest Gain of Antenna

HIGHEST GAIN OF ANTENNA LIST		
OPERATION BAND	GAIN VALUE (dBi)	
5GHz (Band 1~2)	5.56	
5GHz (Band 3)	5.34	

3.4.1.1 Output Powers

802.11a Mode:

Channel	CONDUCTED POWER (dBm)
(CH36) 5180 MHz	15.91
(CH64) 5320 MHz	15.32
(CH100) 5500 MHz	15.64
(CH140) 5700 MHz	15.46

802.11n (HT20) Mode:

Channel	CONDUCTED POWER (dBm)
(CH36) 5180 MHz	15.69
(CH64) 5320 MHz	15.33
(CH100) 5500 MHz	16.04
(CH140) 5700 MHz	16.01

802.11n (HT40) Mode:

Channel	CONDUCTED POWER (dBm)
(CH38) 5190 MHz	14.59
(CH62) 5310 MHz	14.45
(CH102) 5510 MHz	14.38
(CH134) 5670 MHz	15.20



802.11ac (VHT80) Mode:		
Channel	CONDUCTED POWER (dBm)	
(CH38) 5190 MHz	14.19	
(CH62) 5310 MHz	14.32	
(CH102) 5510 MHz	14.08	
(CH134) 5670 MHz	14.37	



	EUT configure		Applicable to					Description				
m	node	FS	OB	ROP	TPC	PD	AD	SE<1G	SE≥1G	SSM		escription
	-	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		-
nere	e FS: I	Frequer	icy Stat	oility			•		OB: Oco	cupied	channel bandwidth	measurement
	ROP	: RF ou	tput po	wer					TPC: Tr	ansmit	Power Control	
	PD:	Power [Density						AD: Ada	aptivity	(Channel Access M	echanism)
		•		missions Spectrum					SE≥1G:	Spuric	ous Emissions above	e 1GHz
		n has 1 avai ture).	beer lable	n condu modula	cted itions	to dete , data	ermine rates	the w and a	orst-ca antenna	ise m a poi	rts (if EUT wi	ossible combinatic th antenna divers
Í	Mo	•	Ì	lable Cha	,			N	odulatio	on	Data Rate (Mbps)	
-				36 to 64		3	36		OFDM		6	-
		802.11a							-			
	Ipied Ch Pre-Sca between architect	n has n has n avai ture).	Band beer lable	n condu modula	Meas cted	to dete to dete	ermine rates	and	antenna	a po	rts (if EUT wi	ossible combinatic th antenna divers
]	ipied Ch Pre-Sca between	n has n has n avai ture). ng chai	Band beer lable nnel(s	lwidth I condu modula	Meas cted itions vere)	to dete s, data selecte	n <u>t:</u> ermine rates d for the	and a e final	orst-ca antenna test as	a po listec	node from all p rts (if EUT wi	
]	upied Ch Pre-Sca between architect Followin	n has n has n avai ture). ng chai	Band beer lable nnel(s	dwidth I condu modula) was (w	Meas cted itions vere)	to dete , data selecte Tested	n <u>t:</u> ermine rates d for the	and a e final	orst-ca antenna test as	a po listec	node from all p rts (if EUT wi d below. Data Rate (Mbps)	
]	upied Ch Pre-Sca between architect Followin	n has avai ture). Ig chai de	Banc beer lable nnel(s	dwidth I condu modula) was (w lable Cha	Meas cted itions vere)	to dete , data selecte Tested	nt: ermine rates d for the Channe	and a e final	orst-ca antenna test as odulatic	a po listec	node from all p rts (if EUT wi d below.	
	Ipied Ch Pre-Sca between architect Followin Mo 802.	n has n has n avai ture). g char de	Banc beer lable nnel(s	Iwidth I condu modula) was (w lable Cha 36 to 64	Meas cted itions vere)	to dete s, data selecte Tested	nt: ermine rates d for the Channe	and a e final	orst-ca antenna test as odulatio chnolog OFDM	a po listec	node from all p rts (if EUT wi d below. Data Rate (Mbps) 6	
	upied Ch Pre-Sca between architect Followin	n has n has n avai ture). g char de	Banc beer lable nnel(s	Jwidth I n condu modula) was (w lable Cha 36 to 64 100 to 140	Meas cted ttions vere)	to dete s, data selecte Tested	nt: ermine rates d for the Channe 36 00	and a e final	orst-ca antenna test as odulatic echnolog OFDM OFDM	a po listec	node from all p rts (if EUT wi d below. Data Rate (Mbps) 6 6	
	Ipied Ch Pre-Sca between architect Followin Mo 802.	n has n avai ture). g chai de 11a (HT20)	Banc beer lable nnel(s	Iwidth I n condu modula) was (w lable Cha 36 to 64 100 to 140 36 to 64	Meas cted ttions vere)	to dete s, data selecte Tested	nt: ermine rates d for the Channe 36 00 36	and a e final	orst-ca antenna test as odulatic chnolog OFDM OFDM OFDM	a po listec	node from all p rts (if EUT wi d below. Data Rate (Mbps) 6 6 6 6.5	
	Ipied Ch Pre-Sca between architect Followin Mo 802.	n has n avai ture). g chai de 11a (HT20)	Banc beer lable nnel(s Avai	Jwidth I n condu modula) was (w lable Cha 36 to 64 100 to 140 36 to 64	Meas cted itions vere) annel	to dete s, data selecte Tested	nt: ermine rates d for the Channe 36 00 36 00	and a e final	orst-ca antenna test as odulatic echnolog OFDM OFDM OFDM	a po listec	node from all p rts (if EUT wi d below. Data Rate (Mbps) 6 6 6 6.5 6.5	
]	Ipied Ch Pre-Sca between architect Followin Mo 802.	n has n avai ture). Ig chai de 11a (HT20) (HT40)	Banc beer lable nnel(s Avai	Jwidth I n condu modula) was (w lable Cha 36 to 64 100 to 140 36 to 64 100 to 140 38 to 62	Meas cted itions vere) annel	to dete s, data selecte Tested	nt: ermine rates d for the Channe 36 00 36 00 38	and a e final	orst-ca antenna test as odulatic schnolog OFDM OFDM OFDM OFDM	a po listec	node from all p rts (if EUT wi below. Data Rate (Mbps) 6 6 6 6 6.5 6.5 13.5	



RF Output Power:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
802.11a	36 to 64	36, 64	OFDM	6
602.11a	100 to 140	100, 140	OFDM	6
802 11p (UT20)	36 to 64	36, 64	OFDM	6.5
802.11n (HT20)	100 to 140	100, 140	OFDM	6.5
802 11p (UT40)	38 to 62	38, 62	OFDM	13.5
802.11n (HT40)	102 to 134	102, 134	OFDM	13.5
802 11cc (\/LIT90)	42 to 58	42, 58	OFDM	29.3
802.11ac (VHT80)	106 ot 122	106, 122	OFDM	29.3

Following channel(s) was (were) selected for the final test as listed below.

Transmit Power Control (TPC):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
902 11 0	52 to 64	64	OFDM	6
802.11a	100 to 140	100, 140	OFDM	6
902 11p (UT20)	52 to 64	64	OFDM	6.5
802.11n (HT20)	100 to 140	100, 140	OFDM	6.5
902 11p (UT40)	54 to 62	62	OFDM	13.5
802.11n (HT40)	102 to 134	102, 134	OFDM	13.5
802 11 cc () // IT80)	58	58	OFDM	29.3
802.11ac (VHT80)	106 ot 122	106, 122	OFDM	29.3

Following channel(s) was (were) selected for the final test as listed below.



Power Density:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
802.11a	36 to 64	36, 64	OFDM	6
002.11a	100 to 140	100, 140	OFDM	6
802 11p (UT20)	36 to 64	36, 64	OFDM	6.5
802.11n (HT20)	100 to 140	100, 140	OFDM	6.5
802 11p (UT40)	38 to 62	38, 62	OFDM	13.5
802.11n (HT40)	102 to 134	102, 134	OFDM	13.5
802 1122 () (1780)	42 to 58	42, 58	OFDM	29.3
802.11ac (VHT80)	106 ot 122	106, 122	OFDM	29.3

Following channel(s) was (were) selected for the final test as listed below.

Adaptivity Test:

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology
	42 to 58	42	OFDM
802.11ac (VHT80)	106 ot 122	106 OFDM	

Spurious Emissions Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	
902 11p (UT20)	36 to 64	140	OFDM	6.5	
802.11n (HT20)	100 to 140	140	OFDIVI		
Dessiver	36 to 64	140			
Receiver	100 to 140	140	-	-	



Spurious Emissions Test (Above 1 GHz):

Receiver

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

2	Following channel(s) was (were) selected for the final test as listed below.							
	Mode Available Channel		Tested Channel	Modulation Technology	Data Rate (Mbps)			
	802.11a	36 to 64	36	OFDM	6			
	802.11n (HT20)	100 to 140	100	OFDM	6.5			
		36 to 64	36	-	-			

100

Following channel(s) was (were) selected for the final test as listed below.

100 to 140

Transmitter Unwanted Emissions within the 5GHz RLAN Bands (Signal under Spectrum Mask):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Mode	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
802.11a	36 to 64	36, 64	OFDM	6
602.11a	100 to 140	100, 140	OFDM	6
802 11p (UT20)	36 to 64	36, 64	OFDM	6.5
802.11n (HT20)	100 to 140	100, 140	OFDM	6.5
	38 to 62	38, 62	OFDM	13.5
802.11n (HT40)	102 to 134	102, 134	OFDM	13.5
802 1122 () (1780)	42 to 58	42, 58	OFDM	29.3
802.11ac (VHT80)	106 to 122	106, 102	OFDM	29.3

Following channel(s) was (were) selected for the final test as listed below.

Test Condition:

Applicable to	Environmental conditions	Input Power (System)	Tested by	
FS	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	
ОВ	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	
ROP	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	
TPC	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	
PD	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	
AD	25deg. C, 60%RH	230Vac, 50Hz	Denny Liu	
SE<1G	22deg. C, 65%RH	230Vac, 50Hz	Louis Tseng	
SE≥1G	22deg. C, 65%RH	230Vac, 50Hz	Louis Tseng	
SSM	25deg. C, 60%RH	230Vac, 50Hz	Chiashiang Lin	



3.6 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
А	NOTEBOOK COMPUTER	DELL	E5430	GM1SKV1	FCC DoC	Provided by Lab
В	PCI-E Test tool	Qualcomm Atheros	NA	NA	NA	Supplied by Client

NOTE:

1. All power cords of the above support units are non-shielded (1.8 m).

3.6.1 Configuration of System under Test

NOTEBOOK	PCI-E Test tool (B)
COMPUTER (A)	EUT



3.7 General Description of Applied Standards

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standard:

EN 301 893 V1.8.1 (2015-03)

All test items have been performed and recorded as per the above standard.



4 Test Procedure and Results

Transmitter Parameters

4.1 Carrier Frequencies and Channelization

4.1.1 Limits of Carrier Frequencies and Channelization

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range fc \pm 20 ppm.

4.1.2 Test Procedures

Refer to EN 301 893 V1.8.1 clause 5.3.2.2.

4.1.3 Deviation from Test Standard

No deviation

4.1.4 Test Setup

The EUT was placed into the temperature oven. The power source of the EUT has to be connected with the power supply for voltage change. The frequency has to be recorded for the above threshold.

4.1.5 Test Results

802.11a

			Carrier Centre Frequencies fc (MHz)				
Te	est Co	ndition	(CH36) 5	180 MHz	(CH140) 5700 MHz		
			Reading	ppm	Reading	ppm	
Tnom(°C)	25	V _{nom} (V)	5180.0106	2.0463	5700.0138	2.4211	
T _{min} (°C)	-10	V _{min} (V)	5180.0017	0.3282	5699.9998	-0.0351	
T min(C)		V _{max} (V)	5180.0025	0.4826	5700.0042	0.7368	
T _{max} (°C)	70	V _{min} (V)	5179.9891	-2.1042	5700.0007	0.1228	
I max(C)	10	V _{max} (V)	5179.987	-2.5097	5699.9862	-2.4211	



4.2 Nominal and Occupied Channel Bandwidth Measurement

4.2.1 Limit of Nominal and Occupied Channel Bandwidth Measurement

The Nominal Channel Bandwidth shall be at least 5 MHz at all times.

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement

During an established communication, the device is allowed to operate temporarily with an Occupied Channel Bandwidth below 80 % of its Nominal Channel Bandwidth with a minimum of 4 MHz.

4.2.2 Test Procedure

Refer to EN 301 893 V1.8.1 clause 5.3.3.2

Measurement Method			
⊠ Conducted measurement	Radiated measurement		

4.2.3 Deviation from Test Standard

No deviation.

4.2.4 Test Setup

The test setup has been constructed as the normal use condition. Controlling software (QCRT-CONN) has been activated to set the EUT on specific status.



4.2.5 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Minimum limit (MHz)	Maximun limit (MHz)	Pass / Fail
36	5180	19.28	16	20	Pass
100	5500	18.32	16	20	Pass

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Minimum limit (MHz)	Maximun limit (MHz)	Pass / Fail
36	5180	18.24	16	20	Pass
100	5500	20	16	20	Pass

802.11n (HT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Minimum limit (MHz)	Maximun limit (MHz)	Pass / Fail
38	5190	37.12	32	40	Pass
134	5670	36.48	32	40	Pass

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Minimum limit (MHz)	Maximun limit (MHz)	Pass / Fail
58	5290	76.16	64	80	Pass
122	5610	75.52	64	80	Pass



4.3 RF Output Power and Transmit Power Control (TPC)

4.3.1 Limits of RF output power

Frequency Range	Mean e.i.r.p. Limit (dBm)			
(MHz)	With TPC	U Without TPC		
5150 to 5350	23	20 / 23 (see note 1)		
5470 to 5725	30 (see note 2)	27 (see note 2)		
Note 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.				

Note 2: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

Note 3: In case of multiple (adjacent or non-adjacent) channels within the same sub-band, the total RF output power of all channels in that sub-band shall not exceed the limits defined above table. In case of multiple, non-adjacent channels operating in separate sub-bands, the total RF output power in each of the sub-bands shall not exceed the limits defined above table.

4.3.2 Limits of RF Output Power at Lowest Power Level

Frequency Range (MHz)	Average EIRP (dBm)			
5250 to 5350	17			
5470 to 5725	24(see note)			
Note: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.				

4.3.3 Test Procedure

Refer to EN 301 893 V1.8.1 clause 5.3.4.2

	Measurement					
	Conducted measurement Radiated measurement					
\square	Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment).					
	Option 2: For equipment without continuous transmission capability and operating (or with the capability					
	to operate) in only one sub-band.					
Option 3: For equipment without continuous transmission capability and having simultaneous						
	transmissions in both sub-bands.					

4.3.4 Deviation from Test Standard

No deviation.

4.3.5 Test Setup

The test setup has been constructed as the normal and extreme test conditions. The RF power as defined in EN 301 893 clause 4.4.1.1 shall be measured and recorded. Controlling software (QCRT-CONN) has been activated to set the EUT on specific status.



4.3.6 Test Results for RF Output Power at the Highest Power Level

<u>802.11a</u>

			Transmitter Power (dBm)		
Test Condition		ondition	(CH36) 5180 MHz	(CH64) 5320 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	21.47	20.88	
Tmin(°C)	10	Vmin(v)	22.19	21.63	
Tmin(℃)	-10	Vmax(v)	22.21	21.64	
Tmov(°C)	70	Vmin(v)	20.34	19.80	
Tmax(℃)	70	Vmax(v)	20.34	19.78	

			Transmitter Power (dBm)		
Test Condition		ondition	(CH100) 5500 MHz	(CH140) 5700 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	20.98	20.80	
Tracia (°C)	10	Vmin(v)	21.71	21.53	
Tmin(℃)	nin(℃) -10	Vmax(v)	21.69	21.48	
Tmov(°C)	70	Vmin(v)	19.94	19.71	
Tmax(°C)	70	Vmax(v)	19.97	19.74	



802.11n (HT20)

			Transmitter	Power (dBm)
Test Condition			Test Condition (CH36) 5180 MHz	
			Average EIRP	Average EIRP
Tnom(°C)	25	Vnom(v)	21.25	20.89
Tracia (°C)	1	Vmin(v)	21.96	21.62
Tmin(℃)	-10	Vmax(v)	21.99	21.57
Tmov(°C)	70	Vmin(v)	20.19	19.77
Tmax(℃) 7		Vmax(v)	20.21	19.76

			Transmitter Power (dBm)		
Test Condition		ondition	(CH100) 5500 MHz	(CH140) 5700 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	21.38	21.35	
Tracia (°C)	10	Vmin(v)	22.11	22.07	
Tmin(℃)	-10	Vmax(v)	22.15	22.06	
Tmov(°C)	70	Vmin(v)	20.29	20.23	
Tmax(℃) 70	70	Vmax(v)	20.32	20.28	



802.11n (HT40) Transmitter Power (dBm) (CH38) (CH62) **Test Condition** 5190 MHz 5310 MHz Average EIRP Average EIRP Tnom(°C) 25 Vnom(v) 20.15 20.01 20.88 20.74 Vmin(v) Tmin(°C) -10 20.92 20.78 Vmax(v) Vmin(v) 19.04 18.95 Tmax(°C) 70 19.00 18.94 Vmax(v)

			Transmitter Power (dBm)		
т	est Co	ondition	(CH102) 5510 MHz	(CH134) 5670 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	19.72	20.54	
Train(°C)	10	Vmin(v)	20.48	21.33	
Tmin(℃)	-10	Vmax(v)	20.48	21.29	
Tmax(°C)	70	Vmin(v)	18.68	19.40	
Tmax(°C)	70	Vmax(v)	18.71	19.41	



802.11ac (VHT80)						
			Transmitter Power (dBm)			
т	est Co	ondition	(CH42) 5210 MHz	(CH58) 5290 MHz		
			Average EIRP	Average EIRP		
Tnom(℃)	25	Vnom(v)	19.75	19.88		
Tasia (°C)	10	Vmin(v)	20.45	20.60		
Tmin(℃)	-10	Vmax(v)	20.45	20.61		
Tracy(°C)	70	Vmin(v)	18.63	18.87		
Tmax(℃)	70	Vmax(v)	18.61	18.88		

			Transmitter Power (dBm)		
Test Condition			(CH106) 5530 MHz	(CH122) 5610 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	19.42	19.71	
Tracing(°C)	10	Vmin(v)	20.16	20.42	
Tmin(℃)	-10	Vmax(v)	20.14	20.45	
Tmov(°C)	70	Vmin(v)	18.29	18.62	
Tmax(℃)	70	Vmax(v)	18.27	18.65	



4.3.7 Test Results for RF Output Power at the Lowest Power Level

802.11a

			Transmitter Power (dBm)		
Т	est Co	ondition	(CH64) 5320 MHz	(CH100) 5500 MHz	
			Average EIRP	Average EIRP	
Tnom(°C)	25	Vnom(v)	15.88	15.98	
Tracia (°C)	10	Vmin(v)	16.63	16.71	
Tmin(℃)	-10	Vmax(v)	16.64	16.69	
Transviller	70	Vmin(v)	14.80	14.94	
Tmax(℃)		Vmax(v)	14.78	14.97	

Test Condition		ondition	Transmitter Power (dBm) (CH140) 5700 MHz Average EIRP
Tnom(°C)	25 Vnom(v)		15.80
Tracia (°C)	10	Vmin(v)	16.53
Tmin(℃)	-10	Vmax(v)	16.48
Tmov(°C)	70	Vmin(v)	14.71
Tmax(℃)	70	Vmax(v)	14.74



802.11n (HT20)

			Transmitter Power (dBm)		
Те	est Co	ondition	(CH64) 5320 MHz	(CH100) 5500 MHz	
			Average EIRP	Average EIRP	
Tnom(℃)	25	Vnom(v)	15.89	15.38	
Tracing (°C)	1	Vmin(v)	16.62	16.11	
Tmin(°C)	-10	Vmax(v)	16.57	16.15	
Tracy(°C)	70	Vmin(v)	14.77	14.29	
Tmax(°C)		Vmax(v)	14.76	14.32	

Test Condition		ondition	Transmitter Power (dBm) (CH140) 5700 MHz Average EIRP
Tnom(°C)	25	Vnom(v)	15.35
Train (°C)	10	Vmin(v)	16.07
Tmin(℃)	-10	Vmax(v)	16.06
Tmov(°C)	70	Vmin(v)	14.23
Tmax(℃)	70	Vmax(v)	14.28



802.11n (HT40) Transmitter Power (dBm) (CH62) (CH102) **Test Condition** 5310 MHz 5510 MHz Average EIRP Average EIRP Tnom(°C) 25 Vnom(v) 16.01 15.72 16.74 16.48 Vmin(v) Tmin(°C) -10 16.78 16.48 Vmax(v) Vmin(v) 14.95 14.68 Tmax(°C) 70 14.94 14.71 Vmax(v)

Т	est Co	ondition	Transmitter Power (dBm) (CH134) 5670 MHz Average EIRP
Tnom(°C)	25	Vnom(v)	15.54
Train(°C)	10	Vmin(v)	16.33
Tmin(℃)	in(℃) -10	Vmax(v)	16.29
Tmov(°C)	70	Vmin(v)	14.40
Tmax(℃)	70	Vmax(v)	14.41



802.11ac (VHT80)						
			Transmitter Power (dBm)			
т	est Co	ondition	(CH58) 5290 MHz	(CH106) 5530 MHz		
			Average EIRP	Average EIRP		
Tnom(℃)	25	Vnom(v)	15.88	15.42		
Tasia (°C)		Vmin(v)	16.60	16.16		
Tmin(℃)	-10	Vmax(v)	16.61	16.14		
Tracy(°C)	70	Vmin(v)	14.87	14.29		
Tmax(℃)	70	Vmax(v)	14.88	14.27		

Т	est Co	ondition	Transmitter Power (dBm) (CH122) 5610 MHz Average EIRP
Tnom(°C)	25	Vnom(v)	15.71
Train(°C)	10	Vmin(v)	16.42
Tmin(℃)	(°C) -10	Vmax(v)	16.45
Tmov(°C)	70	Vmin(v)	14.62
Tmax(℃)	70	Vmax(v)	14.65



4.4 Power Density

4.4.1 Limit of Power Density

Frequency Band	Mean e.i.r.p. Density Limit (dBm/MHz)					
(MHz)	With TPC	U Without TPC				
5150 to 5350	10	7 / 10 (see note 1)				
5470 to 5725	17 (see note 2)	14 (see note 2)				
Note 1: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.						
Note 2: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.						
Note 3: In case of multiple (adjacent or non-adjacent	t) channels within the same su	ub-band, the total RF output				

power of all channels in that sub-band shall not exceed the limits defined above table. In case of multiple, non-adjacent channels operating in separate sub-bands, the total RF output power in each of the sub-bands shall not exceed the limits defined above table

4.4.2 Test Procedure

Refer to EN 301 893 V1.8.1 clause 5.3.4.2.1.3

	Measurement						
	Conducted measurement	Radiated measurement					
\boxtimes	Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment)						
	Option 2: For equipment without continuous transmission capability and without the capability to transmit with a constant duty cycle						

4.4.3 Deviation from Test Standard

No deviation.

4.4.4 Test Setup

The transmitter shall be connected to the measuring equipment via a suitable attenuator and the power density value shall be measured and recorded.



4.4.5 Test Results

802.11a

Channel Number	Channel Frequency (MHz)	Power Density (dBm/1MHz) (EIRP)	Limit (dBm/1MHz) (EIRP)	Pass/Fail
36	5180	9.21	10	Pass
64	5320	8.76	10	Pass
100	5500	8.85	10	Pass
140	5700	8.72	10	Pass

802.11n (HT20)

Channel Number	Channel Frequency (MHz)	Power Density (dBm/1MHz) (EIRP)	Limit (dBm/1MHz) (EIRP)	Pass/Fail
36	5180	8.97	10	Pass
64	5320	8.61	10	Pass
100	5500	9.06	10	Pass
140	5700	9.02	10	Pass

802.11n (HT40)

Channel Number	Channel Frequency (MHz)	Power Density (dBm/1MHz) (EIRP)	Limit (dBm/1MHz) (EIRP)	Pass/Fail
38	5190	5.03	10	Pass
62	5310	4.91	10	Pass
102	5510	4.63	10	Pass
134	5670	5.42	10	Pass

802.11ac (VHT80)

Channel Number	Channel Frequency (MHz)	Power Density (dBm/1MHz) (EIRP)	Limit (dBm/1MHz) (EIRP)	Pass/Fail
42	5210	1.35	10	Pass
58	5290	1.49	10	Pass
106	5530	1.04	10	Pass
122	5610	1.33	10	Pass



4.5 Adaptive (Channel Access Mechanism)

This requirement applies to equipment, testing shall be performed using the highest nominal channel Bandwidth. The manufacturer shall state whether the UUT is capable of operating as a Frame Based Equipment or Load Based Equipment. See tables for the applicability of adaptive requirements and limit for each of the operational modes.

4.5.1 Limit of Adaptive

Applicability of adaptive requirements and limit

	Operational Mode				
Requirement			Load Based Equipment (Not using any of the mechanisms referen		
rtequirement	Frame Based Equipment		Option A	Option B	
Minimum Clear Channel Assessment (CCA) Time	20us (see note 1)	(see note 2)	20us (see note 1)	20us (see note 1)	
Maximum Channel Occupancy (COT) Time	1 ms to 10 ms	(see note 2)	10ms	(13/32)*q ms (see note 3)	
Minimum Idle Period	5% COT	(see note 2)	CCA or extended CCA	CCA to q*CCA (see note 3)	
Extended CCA check	NA	(see note 2)	q*18us	N*CCA (see note 4)	
Short Control SignallingMaximum duty cycle of 5 % within an observation period of 50 msTransmissions(see note 5)				period of 50 ms	
Note 1: The CCA time used by the equipment shall be declared by the manufacturer. Note 2: Minimum required of EN301 893 section 4.8.3.2 or LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using 'energy detect', as describedin IEEE 802.11 [™] -2012 [8], clause 9, clause 10, clause 18 and clause 20 or as described in IEEE 802.11ac [™] -2013 [9], clause 8, clause 9, clause 10 and clause 22					

Note 3: g is selected by the manufacturer in the range [4..32]

Note 4: The value of N shall be randomly selected in the range [1...q]

Note 5: Adaptive equipment may or may not have Short Control Signalling Transmissions.

Interference threshold level

Maximum transmit power (P _H) EIRP dBm	Threshold level (TL)	
23	(see notes 1 and 2)	

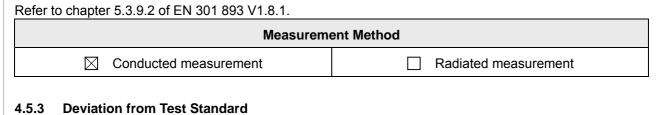
Note 1: For transmit power levels of 23 dBm e.i.r.p. or above, the CCA threshold level (TL), at the input to the receiver, shall be a minimum of -73 dBm/MHz assuming a 0 dBi receive antenna. Note 2: For transmit power levels below 23 dBm e.i.r.p., the CCA threshold level (TL), at the input of the

receiver, shall be proportional to the maximum transmit power (PH) according to the formula which assumes a 0 dBi receive antenna and PH to be specified in dBm e.i.r.p.

TL = -73 dBm / MHz + (23 dBm - PH) / (1 MHz)

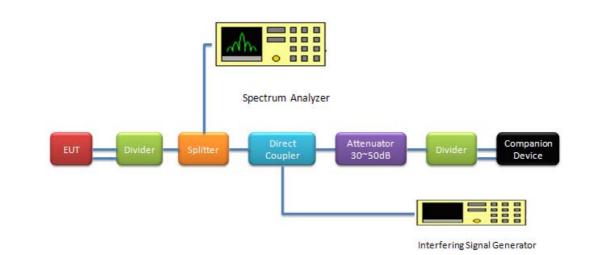


4.5.2 Test Procedure



No deviation.

4.5.4 Test Setup Configuration



UUT Software and Firmware Version

Product	Model No.	Software/Firmware Version
BLACK-Bean	QCNFA435	2016/6/22 11.0.0.688 2016/9/19 11.0.0.700

Companion Device Information

PRODUCT	BRAND	MODEL NO.	SOFTWARE/FIRMWARE VERSION
Wireless AC Module	ALPHA	WMC-AC01	1.0.0 Mon 04 Feb 2013

Note: This module WMC-AC01 was installed in the DIR-868L AP.



4.5.5 List of Measurements

		Limit			
UUT Operational Mode			imum Channel The Minimum idle Pe		imum idle Period
Frame Based Equipment		1ms to 10ms 5% of channel occupanc		nel occupancy time	
Load Based Equipment (Base on 'Spectrum Sharing' mechanisms ')		Follow IEEE 802.11 Less thanms		Follow IEEE 802.11 More thanms	
Load Based Equipment (Not using any of the		Option A	10ms	Option A	CCA or extended CCA
mechanisms referenced)	v	Option B	13 ms	Option B	32us to 640us

Note1: The value of q =32 is declared by the manufacturer. Note2: The value of CCA =20us is declared by the manufacturer.

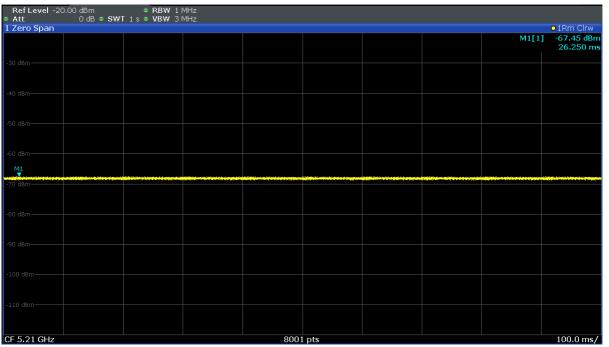
Clause	Test Parameter	Remarks	Pass/Fail
4.8.3.1	Adaptive (Frame Based Equipment)	Not Applicable	NA
4.8.3.2	Adaptive (Load Based Equipment)	Applicable	Pass
4.8.3.3	Short Control Signalling Transmissions	Applicable	Pass



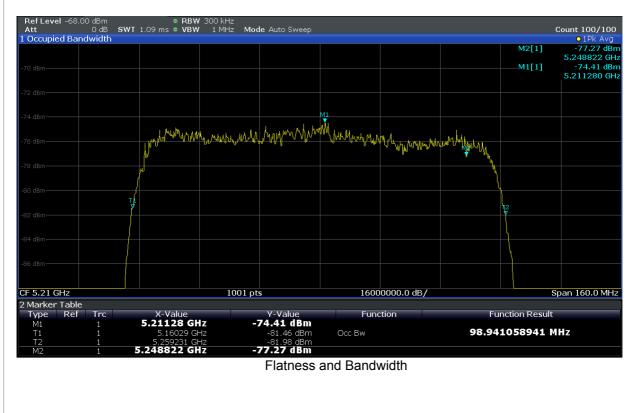
4.5.6 Interference Threshold Level

Detection Threshold Level

The maximum EIRP (Vnom)power is 19.88 dBm and antenna gain is 2.56dBi Detection Threshold level= -73 dBm/MHz + 23 – Pout EIRP (19.88 dBm) + G (2.56 dBi) = -67.32dBm/MHz . The interference signal level to the UUT is lower than -67.32dBm/MHz.



Detection Threshold Level





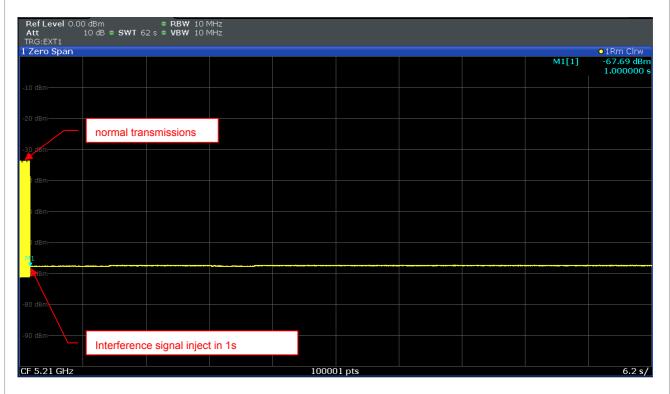
4.5.7 Test Result

4.5.7.1 Adaptive Result

Operating Frequency Bands and Mode of EUT

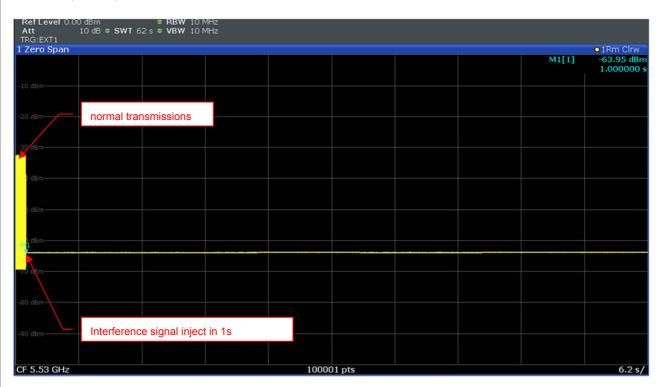
Operational Mode	Operating Frequency (MHz)	Test Result
902 11cc (1/UT90)	5210	Pass
802.11ac (VHT80)	5530	Pass

802.11ac (VHT80) Ch42 5210MHz





802.11ac (VHT80) Ch106 5530MHz



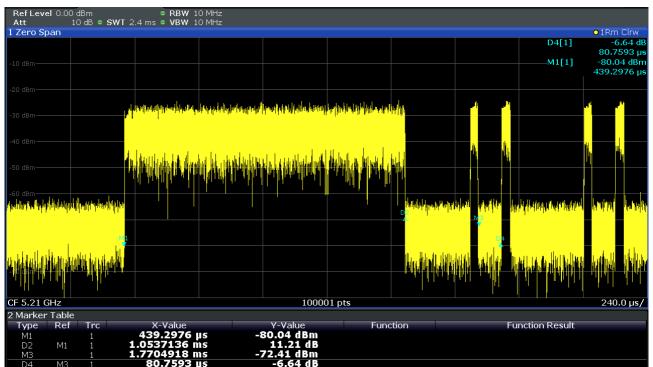


4.5.7.2 The Channel Occupancy Time Result

Operating Frequency Bands and Mode of EUT

Operational Mode	Operating Frequency (MHz)	The Channel Occupancy Time (ms)	Minimum Idle Period (ms)	Test Result
802.11ac (VHT80)	5210	1.05	0.08	Pass

802.11ac (VHT80) mode





4.5.7.3 Short Control Signalling Transmissions Result

802.11ac (VHT80) Ch42 5210MHz

Short Control Signalling Transmission Result				
SCST total on time SCST Limit PASS/FAIL				
0 ms	PASS			

802.11ac (VHT80) Ch106 5530MHz

Short Control Signalling Transmission Result				
SCST total on time SCST Limit PASS/FAIL				
0 ms 2.5ms PASS				



4.6 User Access Restrictions

4.6.1 Definition

User Access Restrictions are constraints implemented in the RLAN device to restrict access of the user to any hardware and/or software settings of the equipment, including software replacement(s), which may impact (directly or indirectly) the compliance of the equipment with the requirements in the present document.

NOTE: The user should be understood as the end user, the operator or any person not responsible for the compliance of the equipment against the requirements in the present document.

4.6.2 Requirement

The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements in clause 4.7.

The above requirement includes the prevention of indirect access to any setting that impacts DFS.

Manufacturer provides declaration form to meet this requirement.



4.7 Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands

4.7.1 Limits of Transmitter Unwanted Emission outside the 5 GHz RLAN Bands

Frequency Range (MHz)	Maximum power, ERP (dBm)	Bandwidth (kHz)
30 to 47	-36	100
47 to 74	-54	100
74 to 87.5	-36	100
87.5 to 118	-54	100
118 to 174	-36	100
174 to 230	-54	100
230 to 470	-36	100
470 to 862	-54	100
862 to 1000	-36	100
Frequency Range (GHz)	Maximum power, EIRP (dBm)	Bandwidth (MHz)
1 to 5.15	-30	1
5.35 to 5.47	-30	1
5.725 to 26	-30	1

4.7.2 Test Procedure

Refer to chapter 5.3.5.2 of EN 301 893 V1.8.1.

Measurement				
Conducted measurement	Radiated measurement			
For Conducted measurement: The level of unwanted emissions shall be measured as their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation).				
Conducted measurement (For equipment with multiple transmit chains): Option 1: The results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the limits.				

Option 2: The results for each of the transmit chains shall be individually compared with the limits after these limits have been reduced by 10 × log₁₀ (T_{CH}) (number of active transmit chains).

4.7.3 Deviation from Test Standard

No deviation

4.7.4 Test Setup

- 1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
- 2. The test setup has been constructed as the normal use condition. Controlling software (QCRT-CONN) has been activated to set the EUT on specific status.



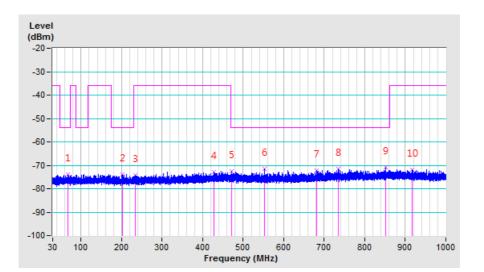
4.7.5 Test Results (Operating – Conducted)

Below 1GHz Worst-Case Data

802.11n (HT20)

SPURIOUS EMISSION FREQUENCY RANGE	130MHz ~ 1(4Hz	OPERATING CHANNEL	140
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	SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin		
68.27	-73.95	-54.00	-19.95		
201.71	-73.73	-54.00	-19.73		
233.97	-74.40	-36.00	-38.40		
427.78	-73.01	-36.00	-37.01		
471.25	-72.68	-54.00	-18.68		
553.46	-71.61	-54.00	-17.61		
681.42	-72.10	-54.00	-18.10		
734.03	-71.67	-54.00	-17.67		
852.37	-70.86	-54.00	-16.86		
916.39	-72.01	-36.00	-36.01		



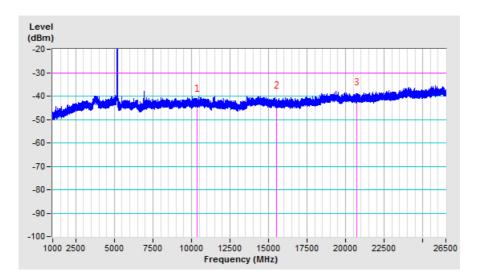


Above 1GHz Worst-Case Data

802.11a

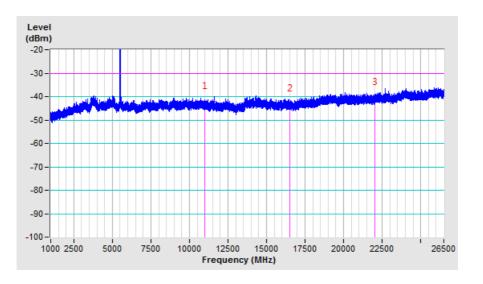
SPURIOUS EMISSION FREQUENCY RANGE	OPERATING CHANNEL	36
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SPURIOUS EMISSION LEVEL				
FrequencyLevelLimit(MHz)(dBm)(dBm)				
10360.00	-43.60	-30.00	-13.60	
15540.00	-42.54	-30.00	-12.54	
20720.00	-41.14	-30.00	-11.14	





802.11n (HT20)				
SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 26GHz	OPERATING CHANNEL	100	
SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin	
11000.00	-42.45	-30.00	-12.45	
16500.00	-43.51	-30.00	-13.51	
22000.00	-40.78	-30.00	-10.78	





4.7.6 Test Results (Operating – Radiated)

Below 1GHz Worst-Case Data

802.11n (HT20)

SPURIOUS EMISSION FREQUENCY RANGE	30MHz ~ 1GHz	OPERATING CHANNEL	140
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	SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)	
47.95	Н	-70.77	-54.00	-16.77	
47.95	V	-69.25	-54.00	-15.25	
67.75	Н	-61.66	-54.00	-7.66	
67.75	V	-64.80	-54.00	-10.80	
135.46	V	-64.25	-36.00	-28.25	
144.01	Н	-62.24	-36.00	-26.24	
150.51	V	-58.87	-36.00	-22.87	
180.21	Н	-64.73	-54.00	-10.73	
222.56	V	-60.32	-54.00	-6.32	
462.07	Н	-71.20	-36.00	-35.20	
497.72	Н	-66.74	-54.00	-12.74	
508.02	V	-71.83	-54.00	-17.83	
532.98	Н	-71.26	-54.00	-17.26	
615.68	Н	-69.18	-54.00	-15.18	
615.73	V	-68.77	-54.00	-14.77	
640.08	V	-71.13	-54.00	-17.13	
696.93	Н	-69.58	-54.00	-15.58	
708.63	V	-69.91	-54.00	-15.91	
749.14	Н	-69.35	-54.00	-15.35	
758.89	V	-69.12	-54.00	-15.12	



Above 1GHz Worst-Case Data

802.11a

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 26GHz	OPERATING CHANNEL	36
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
-	10360.00	Н	-46.97	-30.00	-16.97
	10361.00	V	-42.41	-30.00	-12.41
36	15540.00	Н	-43.11	-30.00	-13.11
30	15540.00	V	-41.09	-30.00	-11.09
	20720.00	Н	-42.43	-30.00	-12.43
	20720.00	V	-39.18	-30.00	-9.18

802.11n (HT20)

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 26GHz	OPERATING CHANNEL	100
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
	11000.00	Н	-47.35	-30.00	-17.35
	11007.00	V	-42.08	-30.00	-12.08
100	16500.00	Н	-43.65	-30.00	-13.65
100	16500.00	V	-39.89	-30.00	-9.89
	22000.00	Н	-40.72	-30.00	-10.72
	22000.00	V	-35.93	-30.00	-5.93



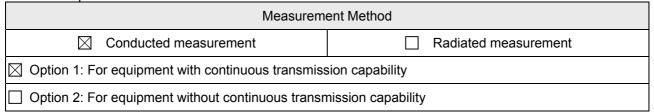
4.8 Transmitter Unwanted Emissions within the 5 GHz RLAN Bands 4.8.1 Limits of Transmitter Unwanted Emissios within the 5 GHz RLAN Bands The average level of the transmitted spectrum shall not exceed the limits given in the following figure: 0 dB = Reference Level -20 dB -28 dB -42 dB -47 dB 1,5 * N -9 * N -1.5*N -10.8 * N 9 * N 10.8 ° N 0 Ν -N 0.5 * N 0,55 * N Frequency offset [MHz] -0.55 *N -0.5 *N N = Nominel Channel Bendwidth [M-iz]

NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

The average level of transmitter unwanted emissions within the 5 GHz RLAN bands shall not exceed the limit of the mask provided above figure or the limit for unwanted emissions provided in section 4.7.1, whichever is the higher.

4.8.2 Test Procedure

```
Refer to chapter 5.3.6.2 of EN 301 893 V1.8.1.
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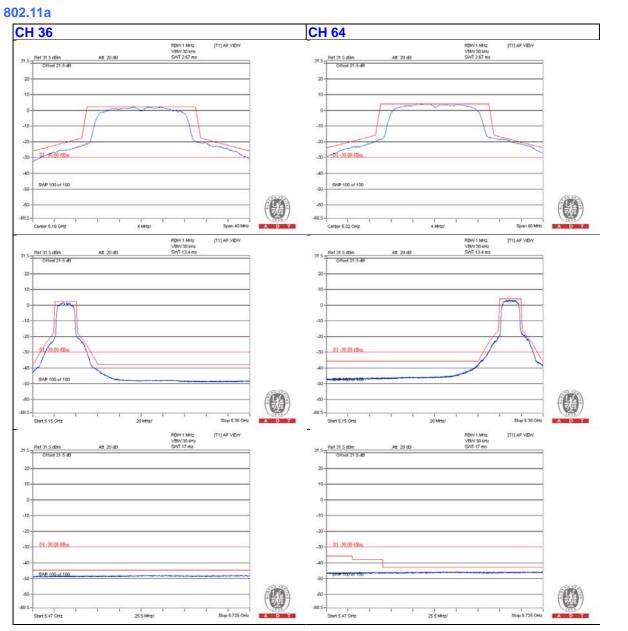
4.8.3 Deviation from Test Standard

No deviation.

4.8.4 Test Setup

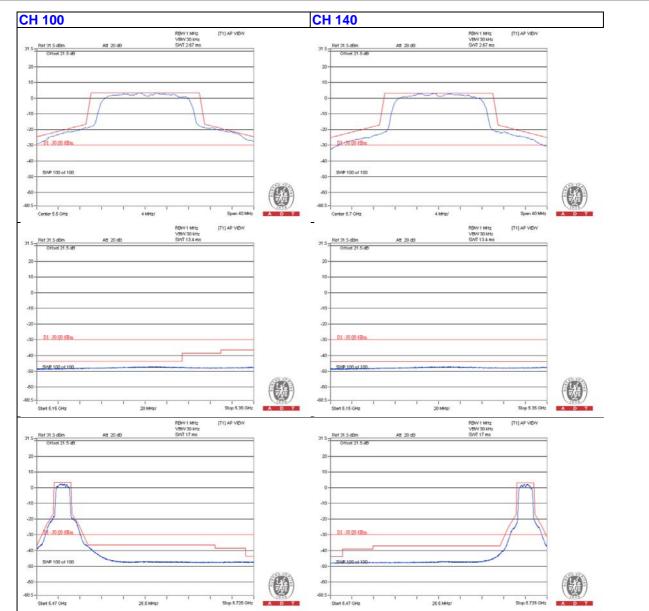
The test setup has been constructed as the normal use condition. Controlling software (QCRT-CONN) has been activated to set the EUT on specific status.



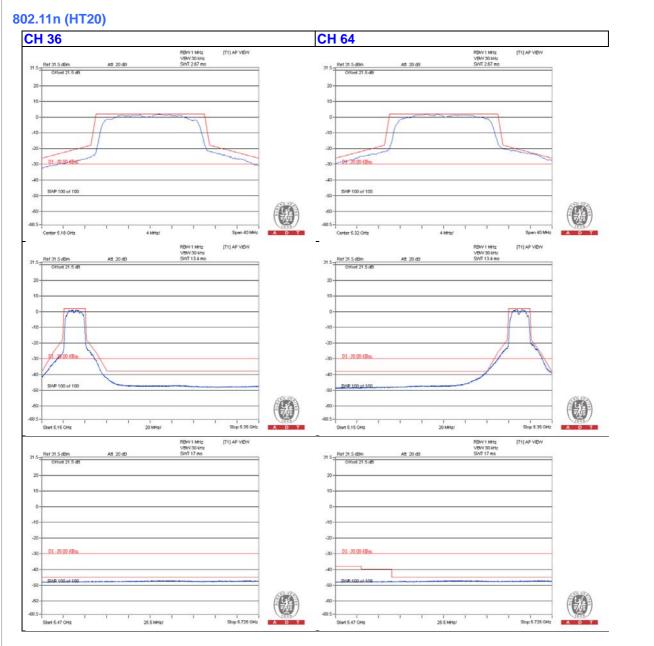


4.8.5 Test Results for unwanted emissions within the 5 GHz RLAN bands at the highest level

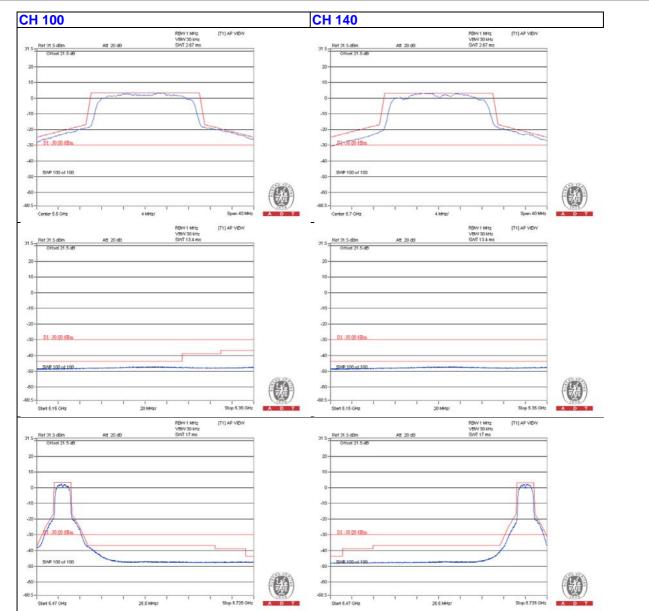




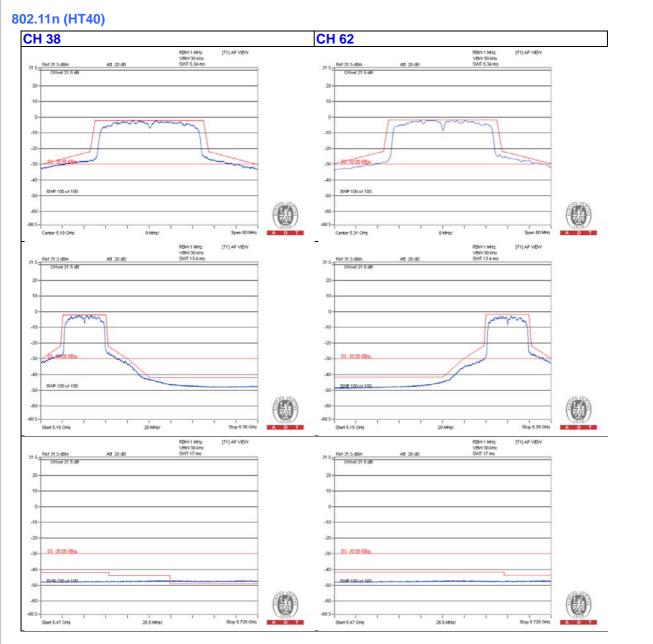




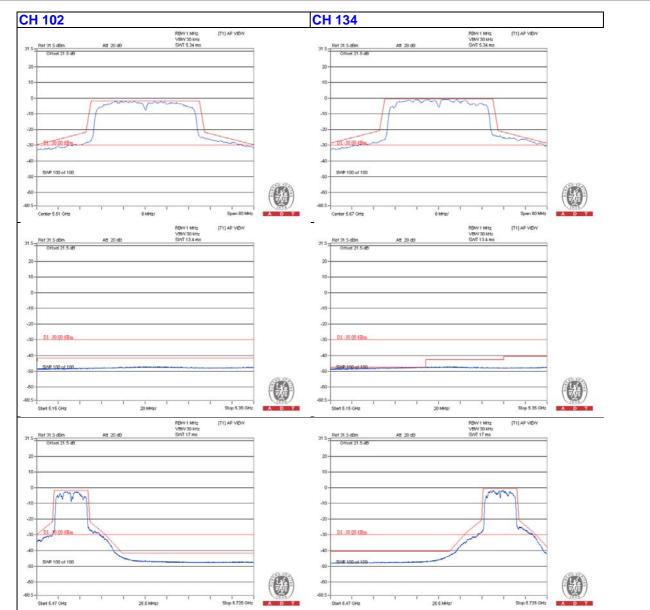




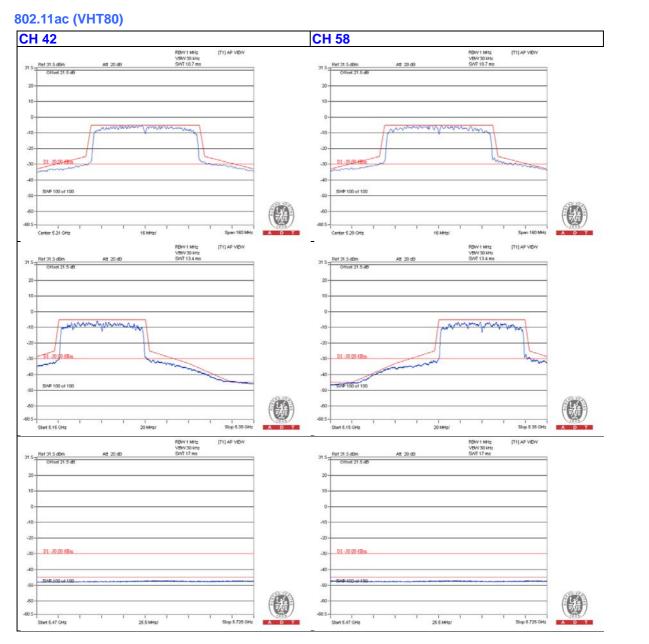




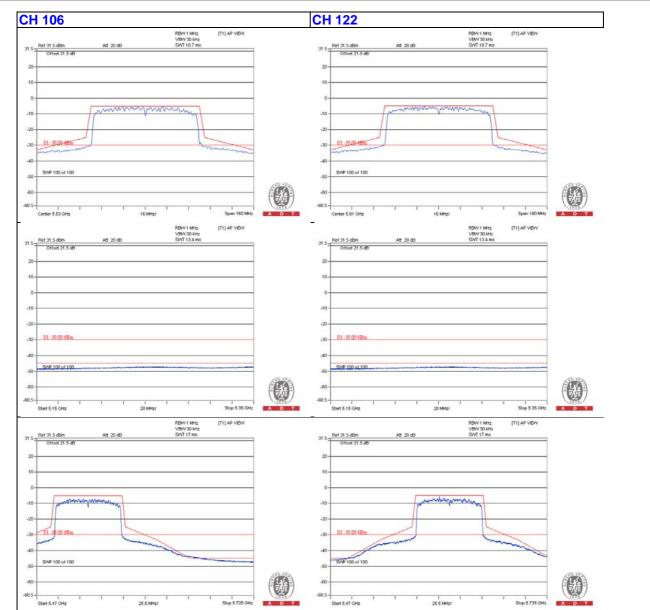














Receiver Parameters

4.9 Receiver Spurious Radiation

4.9.1 Limit of Receiver Spurious Radiation

Frequency Range	Maximum Power Limit ERP (≤ 1 GHz) EIRP (>1 GHz)	
30 MHz ~ 1 GHz	-57dBm	
1 GHz ~ 26 GHz	-47dBm	

4.9.2 Test Procedure

Refer to chapter 5.3.7.2 of EN 301 893 V1.8.1.

Measurement Method					
Conducted measurement	Radiated measurement				
For Conducted measurement:					
The level of unwanted emissions shall be measured as	s their power in a specified load (conducted spurious				
emissions) and their effective radiated power when rac					
the antenna connector(s) terminated by a specified loa	d (cabinet radiation).				
Conducted measurement (For equipment with multiple transmit chains):					
Option 1: The results for each of the transmit chains for the corresponding 1MHz segments shall be					
added and compared with the limits.					
Option 2: The results for each of the transmit chains shall be individually compared with the limits after					
these limits have been reduced by 10 x log (N) (nur	nber of active transmit chains)				

4.9.3 Deviation from Test Standard

No deviation.

4.9.4 Test Setup

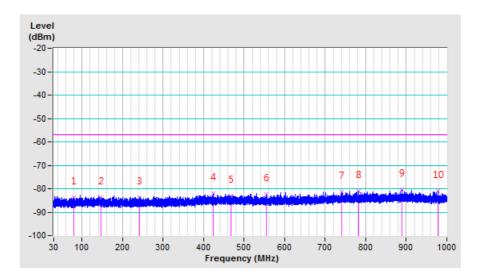
- 1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
- 2. Testing was performed when the equipment was in a receive-only mode.
- 3. The test setup has been constructed as the normal use condition. Controlling software (QCRT-CONN) has been activated to set the EUT on specific status.



4.9.5 Test Results (Operating – Conducted)

RX Below 1GHz worst-Case Data:

	SPURIOUS EMISSION LEVEL			
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin	
79.22	-83.72	-57.00	-26.72	
147.58	-83.56	-57.00	-26.56	
241.08	-83.57	-57.00	-26.57	
424.81	-82.16	-57.00	-25.16	
466.61	-82.92	-57.00	-25.92	
554.64	-82.33	-57.00	-25.33	
740.72	-81.34	-57.00	-24.34	
782.04	-80.91	-57.00	-23.91	
889.08	-80.49	-57.00	-23.49	
978.51	-81.13	-57.00	-24.13	

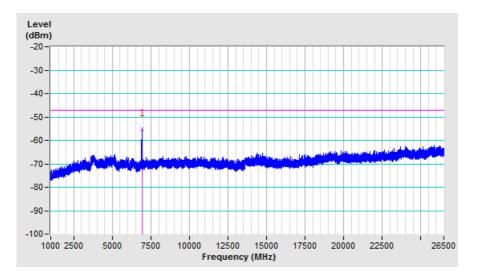


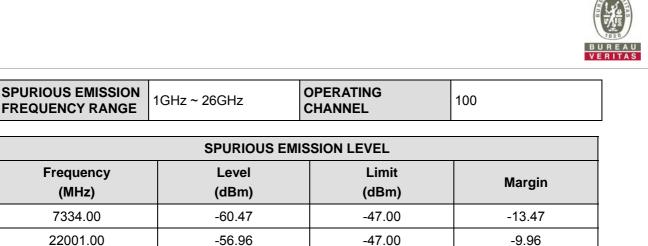


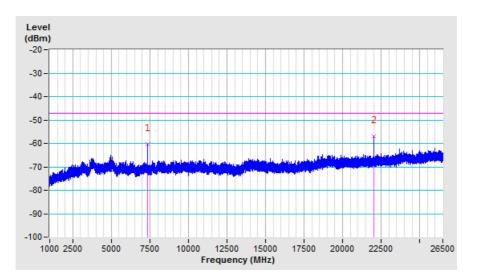
RX Above 1GHz worst-Case Data:

SPURIOUS EMISSION FREQUENCY RANGE1GHz ~ 26GHzOPERATING CHANNEL36
--

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin	
6907.00	-55.36	-47.00	-8.36	









4.9.6 Test Results (Operating – Radiated)

RX Below 1GHz worst-Case Data:

SPURIOUS EMISSION FREQUENCY RANGE	30MHz ~ 1GHz	OPERATING CHANNEL	140
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SPURIOUS EMISSION LEVEL							
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)			
47.95	Н	-70.52	-57.00	-13.52			
47.95	V	-69.11	-57.00	-12.11			
67.75	Н	-62.81	-57.00	-5.81			
67.75	V	-64.38	-57.00	-7.38			
135.46	Н	-62.42	-57.00	-5.42			
135.46	V	-64.20	-57.00	-7.20			
144.01	Н	-62.16	-57.00	-5.16			
144.01	V	-63.00	-57.00	-6.00			
249.16	Н	-64.40	-57.00	-7.40			
257.26	V	-68.04	-57.00	-11.04			
338.72	Н	-66.88	-57.00	-9.88			
366.42	V	-75.68	-57.00	-18.68			
449.27	Н	-68.34	-57.00	-11.34			
455.97	V	-74.05	-57.00	-17.05			
499.67	Н	-66.90	-57.00	-9.90			
508.02	V	-71.36	-57.00	-14.36			
609.68	Н	-70.10	-57.00	-13.10			
615.73	V	-69.55	-57.00	-12.55			
758.94	V	-68.93	-57.00	-11.93			
812.84	Н	-69.08	-57.00	-12.08			

RX Above 1GHz worst-Case Data:

SPURIOUS EMISSION FREQUENCY RANGE	OPERATING CHANNEL	36, 100
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SPURIOUS EMISSION LEVEL								
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)			
36	3453.33	Н	-59.28	-47.00	-12.28			
	3453.33	V	-61.24	-47.00	-14.24			
	6906.55	V	-51.22	-47.00	-4.22			
	6906.75	Н	-53.63	-47.00	-6.63			
100	3666.66	Н	-60.87	-47.00	-13.87			
	3666.66	V	-60.98	-47.00	-13.98			
	7333.30	Н	-54.94	-47.00	-7.94			
	7333.30	V	-53.62	-47.00	-6.62			







Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF/Telecom Lab Tel: 886-3-6668565 Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

The address and road map of all our labs can be found in our web site also.

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