# FCC Test Report

## Report No.: AGC07088160601FE08

FCC ID	:	2AF62-AVTEG001
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)
BRAND NAME	:	Avnet
MODEL NAME	:	AES-BCM-M1
CLIENT	:	Avnet Inc
DATE OF ISSUE	:	July.02, 2016
STANDARD(S)	:	FCC Part 15.247 ANSI C63.10: 2013
REPORT VERSION	:	V1.0



## CAUTION:

This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.



## **Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July.02, 2016	Valid	Original Report

#### TABLE OF CONTENTS

1. VERIFICATION OF COMPLIANCE	5
2.GENERAL INFORMATION	6
2.1PRODUCT DESCRIPTION	6
2.2. TABLE OF CARRIER FREQUENCYS	6
2.3 RELATED SUBMITTAL(S)/GRANT(S)	7
2.4TEST METHODOLOGY	7
2.5 SPECIAL ACCESSORIES	7
2.6 EQUIPMENT MODIFICATIONS	7
3. MEASUREMENT UNCERTAINTY	8
4. DESCRIPTION OF TEST MODES	8
5. SYSTEM TEST CONFIGURATION	9
5.1 CONFIGURATION OF TESTED SYSTEM	9
5.2 EQUIPMENT USED IN TESTED SYSTEM	9
5.3. SUMMARY OF TEST RESULTS	9
6. TEST FACILITY	
7. PEAK OUTPUT POWER	11
7.1. MEASUREMENT PROCEDURE	11
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	11
7.3. LIMITS AND MEASUREMENT RESULT	12
8. 6 DB BANDWIDTH	14
8.1. MEASUREMENT PROCEDURE	14
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	14
8.3. LIMITS AND MEASUREMENT RESULTS	14
9. CONDUCTED SPURIOUS EMISSION	16
9.1. MEASUREMENT PROCEDURE	
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	16
9.3. MEASUREMENT EQUIPMENT USED	
9.4. LIMITS AND MEASUREMENT RESULT	
10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	
10.1 MEASUREMENT PROCEDURE	
10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
10.3 MEASUREMENT EQUIPMENT USED	
10.4 LIMITS AND MEASUREMENT RESULT	
11. RADIATED EMISSION	24

#### Report No.: AGC07088160601FE08 Page 4 of 43

11.1. MEASUREMENT PROCEDURE	24
11.2. TEST SETUP	25
11.3. LIMITS AND MEASUREMENT RESULT	26
11.4. TEST RESULT	26
12. BAND EDGE EMISSION	32
12.1. MEASUREMENT PROCEDURE	32
12.2. TEST SET-UP	32
12.3. TEST RESULT	33
13. FCC LINE CONDUCTED EMISSION TEST	37
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST	37
13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	37
13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	38
13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	38
13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	39
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	41
APPENDIX B: PHOTOGRAPHS OF EUT	43

Applicant	Avnet Inc
Address	2211 S 47th St, Phoenix, Arizona, United States, 85034
Manufacturer	Egoman Digital Corp.
Address Room 404, Block A, Building 1, Tian-An Cyber Park, Longgang District, Shenzhen, 518172, China	
Product Designation	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)
Brand Name	Avnet
Test Model	AES-BCM-M1
Date of test	June.12, 2016 to June.30, 2016
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BLE/RF (2013-03-01)

## **1. VERIFICATION OF COMPLIANCE**

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. 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 radiated emission limits of FCC Rules Part 15.247.

Max 2 Tested by Max Zhang(Zhang Yi) July.02, 2016 Reviewed by Rock Huang(Huang Dinglue) July.02, 2016 Approved by SolgerZhang (Zhang Hongyi) July.02, 2016 Authorized Officer

#### 2.GENERAL INFORMATION

#### 2.1PRODUCT DESCRIPTION

The EUT is "WIFI and BT Modular" designed as a "Communication Device". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	3.457dBm(Max)
Bluetooth Version	V4.1
Modulation	GFSK
Number of channels	40 Channel(37 Hopping Channel,3 advertising Channel)
Antenna Designation	PCB Antenna
Antenna Gain	Antenna A: 3dBi(Antenna B cannot used for BT)
Hardware Version	AES-BCM4343W-M1-G
Software Version	V1.0
Power Supply	DC 5V by Micro-USB port

Note: The BT function cannot support the MiMo mode. Only the antenna A was used and fixed by the software.

#### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency	
2400~2483.5MHZ	0	2402MHZ	
	1	2404MHZ	
	:	:	
	38	2478 MHZ	
	39	2480 MHZ	

#### 2.3 RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2AF62-AVTEG001** filing to comply with Section 15.247of the FCC Part 15, Subpart C Rules.

#### 2.4TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.5 SPECIAL ACCESSORIES

Refer to section 2.2.

#### 2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

#### **3. MEASUREMENT UNCERTAINTY**

Conducted measurement: +/- 3.18dB Radiated measurement: +/- 3.91dB

## 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

## **5. SYSTEM TEST CONFIGURATION**

#### **5.1 CONFIGURATION OF TESTED SYSTEM**

## **Configuration:**



#### **5.2 EQUIPMENT USED IN TESTED SYSTEM**

ltem	Equipment	Mfr/Brand	Model/Type No.	Remark
1	AES-BCM4343W-M1-G(AVNET	AES-BCM-M1	2AF62-AVTEG001	EUT
2	PC	DELL	PP10L	Support
3	PC adapter	DELL	AA22850	Support
4	Control modular	Avnet	AES-BCM4343W–x-G	Support

#### **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Output Power	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.247	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

## 6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014.

## ALL TEST EQUIPMENT LIST

Radiated Emission Test Site						
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016	
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016	
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016	
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016	
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 3, 2016	June 2, 2017	
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A	
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 3, 2016	June 2, 2017	
Spectrum analyzer	Agilent	E4407B	MY46185649	June 3, 2016	June 2, 2017	
Power Sensor	Agilent	U2021XA	MY55050474	Oct.21, 2015	Oct.20, 2016	
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	June 3, 2016	June 2, 2017	
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 3, 2016	June 2, 2017	

Conducted Emission Test Site									
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration				
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016				
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2015	July 7, 2016				
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2015	July 7, 2016				
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2015	July 3, 2016				
Shielded Room	CHENGYU	843	PTS-002	June 3, 2016	June 2, 2017				

## 7. PEAK OUTPUT POWER

#### 7.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port(Antenna A) to the Spectrum Analyzer through an RF attenuator
- 2. RBW≥DTS bandwidth
- 3. VBW≥3\*RBW.
- 4. SPAN≥VBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

#### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP



#### 7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT								
	FOR GFSK MOUDULATION							
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail					
2.402	1.446	21	Pass					
2.441	1.732	21	Pass					
2.480	3.457	21	Pass					

#### CH0

-				••••	·				
鱦 Keysight Sp	pectrum Analyzer - Swept SA								
LXI L	RF 50 Ω AC		SEN	ISE:INT					Book Soorah
Marker 1	1 2.40176000000	) GHz			Avg Type	e: Log-Pwr	TRAC	DE 123456	Feak Search
		PNO: Fast 😱	Trig: Free	Run	Avg Hold	:>100/100	TY		
	-	IFGain:Low	#Atten: 2	0 dB			U		
						Mkr	1 2 401 7	60 GHz	Next Peak
	<b>B</b> - <b>C</b> + <b>C</b> -						1 /	16 dBm	
10 dB/div	Ref 10.00 dBm						1.4	40 U.D.III	
			. 1						
			• • • • •						
0.00									Next PK Right
		****							
-10.0									
	and the second se								
									Next PK Left
-20.0									
-30.0									
									Marker Delta
40.0									
-40.0									
-50.0									
									Mkr→CF
-60.0								I	
-70.0									Mkr→RefLvl
-80.0									
									More
									1.050
Center 2	.402000 GHz						Span 5	.000 MHz	1012
#Res BiA	1.5 MHz	#VBW	5.0 MHz			Sween	1.000 ms	1001 nts)	
			010 111112			спаср	neev mo	, in the pass of t	
MSG						STAT	US		



CH39

			Mk	r1 2.479 985 GHz	Next Peak
10 dB/div Ref 10.00 dl	Bm	1			Next Pk Right
-10.0					Next Pk Left
-40.0					Marker Delta
-60.0					Mkr→CF
-70.0					Mkr→RefLvl
Center 2.480000 GHz #Res BW 1.5 MHz	#VBV	V 5.0 MHz	Sweep	Span 5.000 MHz 1.000 ms (1001 pts)	More 1 of 2

CH19

#### 8.6 DB BANDWIDTH

#### 8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port(Antenna A) to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW $\ge$ 3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC 47CFR 15.247 requirements.

#### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### 8.3. LIMITS AND MEASUREMENT RESULTS

LIMITS AND MEASUREMENT RESULT							
Applicable Limite		Applicable Limits					
	Test Da	Criteria					
	Low Channel	716.7	PASS				
>500KHZ	Middle Channel	714.8	PASS				
	High Channel	697.8	PASS				

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

MSG

STATUS



#### 9. CONDUCTED SPURIOUS EMISSION

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port(Antenna A) to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC 47CFR 15.247 requirements.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT							
Applieghte Limite	Measurement Res	sult					
Applicable Limits	Test Data	Criteria					
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS PASS					

Note: The -20dBc limit line is calculated by the marker point of the bandwidth test plot.



#### TEST RESULT FOR ENTIRE FREQUENCY RANGE

GFSK MODULATION IN LOW CHANNEL

## Report No.: AGC07088160601FE08 Page 18 of 43

🊺 Key	sight Spe	ectrum Ar	nalyzer - Sv	/ept SA									
Mark	ker 1	RF 24.9	50 s 96247	AC 12490	4 GHz		SEN		Avg Type	: Log-Pw >100/100	/r TRA	CE 1 2 3 4 5 6 PE M WWWWW	Peak Search
					IFGain:L	ow	#Atten: 2	0 dB		M	⊳ kr1 24.99	et p nnnn 6 2 GHz	Next Peak
10 dE	3/div	Ref	10.00	dBm							-46.9	33 dBm	
													Nevt Pk Pight
0.00													NEXT F K KIGHL
-10.0													
20.0												-19.29 dBm	Next Pk Left
-20.0													
-30.0													Marker Delta
-40.0													Marker Della
-50.0			. Lancada - a				والمتعالية المحاط	الم الألمالية في ا					Mkr→CF
-60.0		hter			Ŵ			and the second	And we have				
-70.0													Mkr→RefLvl
-80.0													
													More
Star	t <b>2.4</b> 8	GHz							_		Stop 2	25.00 GHz	1 of 2
#Res	SBW	1.0 M	Hz		#	VBW	3.0 MHz		s	weep	58.00 ms (:	30000 pts)	
MSG										STA	TUS		

#### GFSK MODULATION IN MIDDLE CHANNEL

📜 Keysight Spectrum Analyzer - Swept SA				
Marker 1 733.176439215 Μ		Avg Type: Log-Pwr AvglHold:>100/100	TRACE <b>1 2 3 4 5 6</b> TYPE <b>M</b>	Peak Search
10 dB/div Ref 10.00 dBm	IFGain:Low #Atten: 20 dB	Mkr1	733.18 MHz -66.573 dBm	NextPeak
0.00				Next Pk Right
-20.0			-18,54 dBm	Next Pk Left
-30.0				Marker Delta
-60.0				Mkr→CF
-70.0 <mark>sugalar ha të she sa kë que sht të dishtë së së së s</mark>	Nan egi sete anan sete indone addiele fan yn ante en aradere de ante yn a Nan egi sete ante yn Artike yn Artike yn Artike yn aradere yn aradere yn aradere ante yn ar		uda sera tik bagata babah ti Jayan bara na sa kara tinggan pada tang dang panganang	Mkr→RefLvl
Start 30.0 MHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 94.00	top 1.0000 GHz ms (30000 pts)	More 1 of 2
MSG		STATUS		

## Report No.: AGC07088160601FE08 Page 19 of 43

💓 Keysight Sp	ectrum Analyzer - Swept	AC AC	SEN	ISE:INT					
Marker 1	1.464022134	1071 GHz	Trig: Free	Run	Avg Type Avg Hold:	: Log-Pwr >100/100	TRAC	CE 123456 CE M WWWW	Peak Search
		IFGain:Low	#Atten: 20	) dB		Mkr	DE		Next Peak
10 dB/div	Ref 10.00 dE	3m				WIKI	-62.2	78 dBm	
									Next Dis Direkt
0.00									Next PK Right
-10.0									
20.0								-18.54 dBm	Next Pk Left
-20.0									
-30.0									Marker Delta
-40.0									
70.0									
-50.0		. 1							Mkr→CF
-60.0		• • '			· · · · ·				
-70.0 <mark>194<sup>0</sup>94014</mark>	un a la sur la sur de l	adama kildana <mark>kinkatk</mark>	Lating to Lee Datab	l palitic parti darta	lar a trailert a th	ntil og heitigter en	uption in all in particular Anna ann ann an ann an 19	i di midhila anti-	Mkr→RefLvl
DO D	l <sub>e</sub> sterie is cheroiri den la familie di	inin i para municipa di si si sudditi si para danga	an ei feant ear ffin ffin ffin far e faite.						
-80.0									More
Start 1.00	000 GHz						Stop 2.4	1000 GHz	1 of 2
#Res BW	100 kHz	#VBV	V 300 kHz		s	weep 13	4.0 ms (3	0000 pts)	
MNS(2)						OT AT LO			
Keysight Sp	ectrum Analyzer - Swept	t SA				STATUS			
Keysight Sp	ectrum Analyzer - Swept RF 50 Ω 24 36951698	AC GHZ	SEN	ISE:INT	Avg Type	STATUS	TRAC	DE <b>1 2 3 4 5 6</b>	Peak Search
Keysight Sp K L Marker 1	ectrum Analyzer - Swept RF 50 Ω 24.36951698	AC B3900 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 20	Run dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100	TRAC TYF DE	CE 123456 PE MWWWW TPNNNNN	Peak Search
Micu Keysight Sp (X) L Marker 1	ectrum Analyzer - Swept RF 50 Ω 24.36951698	AC B3900 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 20	Run dB	Avg Type Avg Hold:	: Log-Pwr >100/100	TRAC TYP DE 1 24.369	2 3 4 5 6 PE MWWWW PNNNN 9 5 GHz 49 dBm	Peak Search
Marker 1 Marker 1	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	AC 33900 GHz PNO: Fast IFGain:Low BM	⊃ Trig: Free #Atten: 20	ISE:INT Run D dB	Avg Type Avg Hold:	:: Log-Pwr >100/100	TRAC TYF DE 1 24.369 -45.7	9 5 GHz 49 dBm	Peak Search Next Peak
Keysight Sp X L Marker 1 10 dB/div Log	ectrum Analyzer - Swepp RF 50 Ω 24.36951698 Ref 10.00 dE	AC B3900 GHz PNO: Fast IFGain:Low Bm	⊃ Trig: Free #Atten: 20	ISE:INT	Avg Type Avg Hold:	:: Log-Pwr >100/100	TRAC TYP DE 1 24.369 -45.7	E 123456 E MWWWWW ET P NNNNN 9 5 GHz 49 dBm	Peak Search Next Peak Next Pk Right
10 dB/div	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	AC 33900 GHz PNO: Fast IFGain:Low BM	Trig: Free #Atten: 20	Run dB	Avg Type Avg Hold:	:: Log-Pwr >100/100	TRAC TY DE 1 24.369 -45.7	9 5 GHz 49 dBm	Peak Search Next Peak Next Pk Right
10 dB/div Log	ectrum Analyzer - Swepp RF 50 Ω 24.36951698 Ref 10.00 dE	AC B3900 GHZ PNO: Fast IFGain:Low Bm	⊃ Trig: Free #Atten: 20	Run O dB	Avg Type Avg Hold:	: Log-Pwr >100/100	TRAC TYF DE 1 24.363 -45.7	E 123456 E M 9 5 GHz 49 dBm	Peak Search Next Peak Next Pk Right
10 dB/div Marker 1 10 dB/div 0.00 -10.0 -20.0	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	AC 33900 GHZ PNO: Fast IFGain:Low 3m	⊃ Trig: Free #Atten: 20	Run ) dB	Avg Type Avg Hold	:: Log-Pwr >100/100	TRAC TYF DF 1 24.361 -45.7	2 3 4 5 6 E MWWWW T P NNNN 9 5 GHz 49 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Keysight Sp     Marker 1     Marker 1     0 dB/div     Log     .000 -10.0 -20.0 -30.	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	AC 33900 GHz PNO: Fast IFGain:Low BM	→ Trig: Free #Atten: 20	ISE:INT	Avg Type Avg Hold:	STATUS	TRAC TYF DI 1 24.36 -45.7	2 3 4 5 6 E MWWWW P NNNN 9 5 GHz 49 dBm -18 54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Image         Image <th< td=""><td>ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE</td><td>BM</td><td>C Trig: Free #Atten: 20</td><td>ise:int e Run D dB</td><td>Avg Type Avg Hold:</td><td>STATUS</td><td>TRAC TY DF 1 24.360 -45.7</td><td>2 3 4 5 6 P MWWWN P 5 GHz 49 dBm -18.54 dBm</td><td>Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta</td></th<>	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	BM	C Trig: Free #Atten: 20	ise:int e Run D dB	Avg Type Avg Hold:	STATUS	TRAC TY DF 1 24.360 -45.7	2 3 4 5 6 P MWWWN P 5 GHz 49 dBm -18.54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Keysight Sp     Xarker 1     Marker 1	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	AC 33900 GHz PNO: Fast IFGain:Low 3m	C Trig: Free #Atten: 20	ISE:INT P Run D dB	Avg Type Avg Hold	STATUS	TRAC TYF D 1 24.36 -45.7	E 1 2 3 4 5 6 E MWWWW 9 5 GHz 49 dBm -18.54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Keysight Sp           Keysight Sp           Marker 1           10 dB/div           0.00           -10.0           -20.0           -30.0           -40.0	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC B33900 GHZ PNO: Fast IFGain:Low BM	C Trig: Free #Atten: 20	isE:INT P.Run D dB	Avg Type Avg Hold:	status :: Log-Pwr >100/100 <b>Mkr</b>	TRAC TYF DI 1 24.36 -45.7	E 1 2 3 4 5 6 E MWWWW F P NNNN 9 5 GHz 49 dBm -18 54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Bit Keysight Sp           Marker 1           10 dB/div           0.00           -10.0           -20.0           -30.0           -40.0           -50.0	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC 33900 GHz PNO: Fast IFGain:Low 33 33 34 34 34 34 34 34 34 34	C Trig: Free #Atten: 20	ISE:INT P.Run D dB	Avg Type Avg Hold:	STATUS	TRAC TYF DF 1 24.361 -45.7	E 2 3 4 5 6 E M WWWWW T P NNNN 9 5 GHz 49 dBm -18.54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Iteration         Iteration <t< td=""><td>ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE</td><td>ISA AC B3900 GHz PNO: Fast IFGain:Low BM</td><td>Trig: Free #Atten: 20</td><td></td><td>Avg Type Avg Hold:</td><td>STATUS :: Log-Pwr &gt;100/100 MKr</td><td>TRAC TYS DI 1 24.36: -45.7</td><td>E 2 3 4 5 6 E M WWWW P NNNN 9 5 GHz 49 dBm </td><td>Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF</td></t<>	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC B3900 GHz PNO: Fast IFGain:Low BM	Trig: Free #Atten: 20		Avg Type Avg Hold:	STATUS :: Log-Pwr >100/100 MKr	TRAC TYS DI 1 24.36: -45.7	E 2 3 4 5 6 E M WWWW P NNNN 9 5 GHz 49 dBm 	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Io         Keysight Sp           Marker 1           Marker 1           10         B/div           0.00	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC B3900 GHZ PNO: Fast IFGain:Low BM	C SEN		Avg Type Avg Hold:	STATUS :: Log-Pwr >100/100 Mkr	TRAC TY DE 1 24.361 -45.7	E 1 2 3 4 5 6 E MUNITOR NON N 9 5 GHz 49 dBm -18.54 dBm 1 .18.54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Image: Newsight Spin (Newsight Spin (Newsig	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC 33900 GHz PNO: Fast IFGain:Low BM	C Trig: Free #Atten: 20		Avg Type Avg Hold:	STATUS	TRAC TYF DI 1 24.36 -45.7	2E 1 2 3 4 5 6 2E M WWWWW P WWWWWW 9 5 GHz 49 dBm -18.54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl
Keysight Sp           Marker 1           Marker 1           10 dB/div           0.00           -10.0           -20.0           -30.0           -40.0           -60.0           -70.0           -80.0	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC B3900 GHZ PNO: Fast IFGain:Low BM	SEN Trig: Free #Atten: 20		Avg Type Avg Hold:	STATUS	TRAC TYF D 1 24.36 -45.7	E I 2 3 4 5 6 E M WWWW P 5 GHz 49 dBm 	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF MkrRef Lvl
Image: Second system         Image: Se	ectrum Analyzer - Swept RF 50 Ω 24.36951698 Ref 10.00 dE	ISA AC B3900 GHZ PNO: Fast IFGain:Low B B IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGain:Low C IFGAIN	Trig: Free #Atten: 20	SE:INT Run D dB	Avg Type Avg Hold:	STATUS	TRAC TVF D 1 24.36 -45.7	E 2 3 4 5 6 E M WWWWW 9 5 GHz 49 dBm -19 54 dBm 1 -19 54 dBm 1 -19 54 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2

🚺 Keysight Spe LXI L	ectrum Analyzer - Sw RF 50 Ω	ept SA AC		SEN	NSE:INT					
Marker 1	446.75822	5274 MHz	IO: Fast 😱	Trig: Free	Run	Avg Type Avg Hold:	: Log-Pwr >100/100	TRAC	E 1 2 3 4 5 6 E MWWWW	Peak Search
		IFG	ain:Low	#Atten: 2	0 dB		M	cr1 446	76 MHz	Next Peak
10 dB/div	Ref 10.00 (	dBm						-67.1	18 dBm	
										Next Pk Right
0.00										next i k tagik
-10.0										
-20.0									-17.44 dBm	Next Pk Left
-30.0										Marker Delta
-40.0										
-50.0										Mkr_CE
										Miki→Cr
-60.0				↓ <sup>1</sup>						
-70.0 leaders	alayan a baab baablaa Marana ay ahaa ahaa ahaa		lalla contribution nationalistic sector	tar pl <mark>i</mark> de étable la fa	ntation nationalisation nation of the statements	det en eller en ditte ditte en ditte Regeneration et al. Regeneration	n fa se di transferi di terreta di Terreta di terreta di te			Mkr→RefLvi
-80.0										
										More
Start 30.0 #Res BM	MHz 100 kHz		#\/B\/	300 kHz			ween 04	Stop 1.0	0000 GHz	1 of 2
THE DAY	100 KH2		77 V LL V V				**************			
MSG							STATUS			
MSG Keysight Spe	ectrum Analyzer - Sw	ept SA		SEN	VSE-INT		STATUS			
MSG Keysight Spo Warker 1	ctrum Analyzer - Sw RF 50 Ω <b>1.4880096</b>	ept SA AC 00320 GH	IZ	) Trig: Free	NSE:INT	Avg Type Avg Hold:	STATUS :: Log-Pwr :>100/100	TRAC	CE 1 2 3 4 5 6 PE M WWWW	Peak Search
MSG Keysight Spr XI L Marker 1	ectrum Analyzer - Sw RF 50 Ω <b>1.4880096</b> 1	ept SA AC 00320 GH PN IFG	<b>IZ</b> IO: Fast ⊊ Gain:Low	Trig: Free #Atten: 2	NSE:INT P Run 0 dB	Avg Type Avg Hold:	status :: Log-Pwr >100/100	TRAC TYF DE	CE 123456 MWWWW FT PNNNNN 01 GHZ	Peak Search Next Peak
MSG Keysight Spa V L Marker 1 10 dB/div	ectrum Analyzer - Sw RF 50 Ω 1.4880096 Ref 10.00 α	ept SA AC   00320 GH PN IFG dBm	IZ IO: Fast ⊊ Gain:Low	Trig: Free #Atten: 20	se:INT ≥ Run 0 dB	Avg Type Avg Hold:	status :: Log-Pwr :>100/100	TRAC TYF DE 1 1.488 -62.0	01 GHz 52 dBm	Peak Search Next Peak
MSG Keysight Spo Marker 1 10 dB/div Log	ectrum Analyzer - Sw RF 50 Ω 1.4880096 Ref 10.00 c	ept SA AC 00320 GH PN IFG dBm	IZ IO: Fast ⊆ Sain:Low	Trig: Free #Atten: 2	vse:INT e Run 0 dB	Avg Type Avg Hold:	status :: Log-Pwr :>100/100	ткас тур 1 1.488 -62.0	01 GHz	Peak Search Next Peak
MSG Keysight Sp Marker 1 10 dB/div Log	ectrum Analyzer - Sw RF 50 Ω 1.48800960 Ref 10.00 0	ept SA AC PN IFG	Z IO: Fast G ain:Low	) Trig: Free #Atten: 20	se:INT ■ Run 0 dB	Avg Type Avg Hold:	status :: Log-Pwr >100/100	TRAC TYF DE 1 1.488 -62.0	E 123456 E MWWWW ET P NNNNN 01 GHz 52 dBm	Peak Search Next Peak Next Pk Right
MSG Keysight Spi Marker 1 10 dB/div 0.00 -10.0	ectrum Analyzer - Sw RE   50 Ω 1.4880096 Ref 10.00 ¢	ept SA AC   00320 GH PN IFG	Z Ю: Fast ⊂ Sain:Low	Trig: Free #Atten: 2	NSE:INT ⇒ Run 0 dB	Avg Type Avg Hold:	status :: Log-Pwr >100/100	TRAC TY DE 1 1.488 -62.0	2 3 4 5 6 E M T P NNNN 01 GHz 52 dBm	Peak Search Next Peak Next Pk Right
MSG Weysight Spo Marker 1 Marker 1 10 dB/div Log .10.0	ectrum Analyzer - Sw RF 50 Ω 1.48800960 Ref 10.00 0	ept SA AC 00320 GH PN IFG	IZ IQ: Fast G ain:Low	) Trig: Free #Atten: 2	ss:INT	Avg Type Avg Hold:	status :: Log-Pwr >100/100 Mkr	TRAC TYV DF 11.488 -62.0	E 2 3 4 5 6 M MANNA O1 GHz 52 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
MSG Keysight Spi Marker 1 10 dB/div 0.00 -10.0 -20.0	ectrum Analyzer - Sw RF   50 Ω 1.4880096 Ref 10.00 ¢	ept SA AC   OO320 GH PN IFG	Z IO: Fast ain:Low	SEP	ISE:INT	Avg Type Avg Hold	status :: Log-Pwr >100/100	TRAC TYP 0 11.488 -62.0	2 1 2 3 4 5 6 E MWWWWW T P N N N N 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
MSG Weysight Spore Marker 1 10 dB/div Log 0.00 -10.0 -20.0 -30.0	ectrum Analyzer - Sw RF 50 Ω 1.48800960 Ref 10.00 0	ept SA AC 00320 GH PN IFG	Iz IO: Fast ⊊ ain:Low	SEP Trig: Free #Atten: 2	seint	Avg Type Avg Hold:	status :: Log-Pwr >100/100 Mkr	TRAC TYV DF 11.488 -62.0	2 3 4 5 6 MMMM T P NNNN 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
MSG Keysight Spot Marker 1 10 dB/div 0.00 -10.0 -20.0 -40.0	ectrum Analyzer - 5w ℝF   50 Ω 1.4880096 Ref 10.00 d	ept SA AC D0320 GH PN IFG	IZ IO: Fast G ain:Low	SEP Trig: Free #Atten: 20	NSE:INT	Avg Type Avg Hold	status 2: Log-Pwr >100/100 Mkr	TRAC TYY DR 1 1.488 -62.0	E 0 2 3 4 5 6 E MWWWW FT P NNNN 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
MSG Weysight Spo Marker 1 Marker 1 10 dB/div -0.00 -10.0 -20.0 -30.0 -40.0 -50.0	ectrum Analyzer - Sw RF 50 Ω 1.48800961 Ref 10.00 0	ept SA AC OO320 GH PN IFG	IZ IO: Fast C↓ ain:Low	SEP Trig: Free #Atten: 2	e Run 0 dB	Avg Type Avg Hold:	status : Log-Pwr >100/100 Mkr	TRACTYC TYC DF 1 1.488 -62.0	2 3 4 5 6 MWWWWW T P NNNN 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
MSG Keysight Spi Marker 1 10 dB/div 0.00 -10.0 -20.0 -30.0 -30.0 -30.0 -30.0	ectrum Analyzer - Sw RF   50 Ω 1.48800960 Ref 10.00 0	ept SA AC D0320 GH PN IFG	IZ IO: Fast Gain:Low	SEP Trig: Free #Atten: 20	NSE:INT	Avg Type Avg Hold:	status 2: Log-Pwr >100/100 Mkr	TRAC TYY DR 1 1.488 -62.0	2 3 4 5 6 E M MANANA 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
MSG Keysight Spo Marker 1 10 dB/div 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0	ectrum Analyzer - Sw RE   50 Ω 1.4880096 Ref 10.00 ¢	ept SA AC   PN IFG	IZ IO: Fast ⊊ ain:Low	SEP Trig: Free #Atten: 2	e Run 0 dB	Avg Type Avg Hold:	status : Log-Pwr >100/100 Mikr	TRACTYC TYC DI 1 1.488 -62.0	2 3 4 5 6 MWWWW T P NNNN 01 GHz 52 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
MSG WSG Marker 1 10 dB/div 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 Net left	ectrum Analyzer - Sw RF   50 Ω 1.48800960 Ref 10.00 0	ept SA AC   PN IFG	IZ IO: Fast Gain:Low	SEP Trig: Free #Atten: 20	vse:INT	Avg Type Avg Hold:	STATUS	TRAC TYV DF 1 1.488 -62.0	E 1 2 3 4 5 6 M MANANA T P NNNN 01 GHz 52 dBm -17.44 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
MSG Keysight Spo Marker 1 Marker 1 10 dB/div 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 Hattlett	ectrum Analyzer - Sw RE   50 Ω 1.4880096 Ref 10.00 d 	ept SA AC   PN IFG dBm	IZ IO: Fast in:Low 1 Fundamental Fundam	SEP Trig: Free #Atten: 2		Avg Type Avg Hold:	STATUS : Log-Pwr >100/100 Mikr	TRAC TYP DE 1 1.488 -62.0	2 1 2 3 4 5 6 M WANNEY T P N N N N 01 GHz 52 dBm -17.44 dBm -17.44 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
MSG WSG Marker 1 Marker 1 10 dB/div 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 -70.0 Hereiter -60.0	ectrum Analyzer - Sw RF   50 Ω 1.48800960 Ref 10.00 0 	ept SA AC PN IFG	Iz O: Fast ain:Low 1 Formula (Lon Autor)	SEP Trig: Free #Atten: 20			STATUS ST	TRACTY TYP DF 1 1.488 -62.0	E 1 2 3 4 5 6 M MANANA O1 GHz 52 dBm -17.44 dBm -17.44 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl
MSG Keysight Sp Marker 1 10 dB/div 0.00 -10.0 -20.0 -20.0 -40.0 -60.0 -60.0 -70.0 -60.0 -70.0 Start 1.00	ectrum Analyzer - Sw RF   50 Ω 1.4880096 Ref 10.00 0 0.00	ept SA AC D0320 GH PN IFG	IZ IC: Fast IC: Fast I IC: Fast IC: Fa	SEP Trig: Free #Atten: 20	VSE:INT		STATUS	TRACTYY TYPE 1 1.488 -62.0	E 1 2 3 4 5 6 E MAXWAW 01 GHz 52 dBm 	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2

#### GFSK MODULATION IN HIGH CHANNEL



#### Note:

The 100kHz RBW used in the conducted spurious test from 2.4835GHz to 25GHz may result in long measuring times, To avoid such long measuring times, the 1MHz RBW can be used for pre-test. If the emission level exceeded the limit at one or more frequencies, the 100kHz RBW would be used for final test at the special frequency.

#### **10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY**

#### **10.1 MEASUREMENT PROCEDURE**

- (1). Connect EUT RF output port(Antenna A) to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the ANSI C63.10 was used in this testing.

#### **10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

Refer To Section 7.2.

#### **10.3 MEASUREMENT EQUIPMENT USED**

Refer To Section 6.

#### **10.4 LIMITS AND MEASUREMENT RESULT**

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-12.466	8	Pass
Middle Channel	-12.276	8	Pass
High Channel	-10.775	8	Pass

#### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL





#### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



#### 11. RADIATED EMISSION

#### 11.1. MEASUREMENT PROCEDURE

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

#### 11.2. TEST SETUP



#### **11.3. LIMITS AND MEASUREMENT RESULT**

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note:

For Radiated Emission, 3axis were chosen for testing for each applicable mode.

All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

#### 11.4. TEST RESULT

#### **RADIATED EMISSION BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.

FCC PART15 B

-6dB

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1				
Temperature	25° C	Relative Humidity 55.4%					
Pressure	960hPa	Test Voltage	Normal Voltage				
Test Mode	Mode 4	Antenna	Horizontal				
eo Level (dBuV/m)							
72.0							

I

#### RADIATED EMISSION BELOW 1GHZ

0.0 2.0 4.0 <b>4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 </b>	A HARAN AND A HARAN	2 •••• •••	W	3 pm//htty///	Valle and the				helevakely	hyddanda	
<sup>0</sup> 30	50		10	)0 Fre	20 equency (N	)0 /Hz)		5	00		1000
No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Le∨el dBuV/m	Limit dBuV/	O∨ Lin m dE	er nit I 3	Remark	

No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	O∨er Limit dB	Remark
1.	50.586	1.53	12.22	51.06	30.15	34.66	40.00	-5.34	Peak
2.	56.197	1.62	11.97	51.28	30.19	34.68	40.00	-5.32	Peak
3.	118.601	2.30	11.90	47.61	30.45	31.36	43.50	-12.14	Peak
4.	166.068	2.60	13.54	43.27	30.57	28.84	43.50	-14.66	Peak
5.	250.301	2.98	11.93	54.31	30.71	38.51	46.00	-7.49	Peak
6.	366.823	3.32	14.56	49.74	30.84	36.78	46.00	-9.22	Peak

#### **RESULT: PASS**

64.0

56.0

48.0

EUT AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)			Model N	Model Name AES-BCM			-M1				
Tempe	erature		25°	25° C Relative Humidity		y 55.	<b>/</b> 55.4%			55.4%	
Pressu	ure		960h	960hPa Test Voltage Normal			Normal Voltage				
Test M	lode		Mod	e 4			Antenn	na Vertical			
80	Level (d	lBuV/m)									
72.0											
64.0											
56.0											F15 B
48.0											-6dB
40.0											
32.0		1	2				- 4	5			
24.0		A	1			3	Arland		6		
16.0		Jr.	N.		- marthe	ph Milling	William	MARAN		phale a laster la	14/WW
8.0	the state of the second	he garage		the fill when the	hw <sup>wr :</sup>			1 NW	1 1944	· · · ·	
0	[										
	30	50		1	00 Fr	20 equency (N	)0 1Hz)		500		1000
			Cable	ANT	Receiver	Preamp	Emission		Over		
	No.	Freq	Loss	Factor	Reading	Factor	Level	Limit	Limit	Remark	
		MHZ	aB	ab/m	abuv	aB	aBuv/m	aBuv/m	ab 		_
	1. 2	54.835 56 197	1.60 1.62	11.91 11.97	50.70 49.28	30.18 30.19	34.03 32.68	40.00 40.00	-5.97 -7.32	Peak Peak	
	3.	166.651	2.61	13.51	39.28	30.57	24.83	43.50	-18.67	Peak	

30.71

30.77

30.90

34.94

32.04

26.36

46.00

46.00

46.00

-11.06

-13.96

-19.64

Peak

Peak

Peak

## RESULT: PASS Note:

4.

5.

6.

250.301

301.422

432.546

1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

11.93

13.22

16.02

2.98

3.14

3.47

2. The "Factor" value can be calculated automatically by software of measurement system.

50.74

46.45

37.77

3. All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.

## Report No.: AGC07088160601FE08 Page 29 of 43

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.026	45.74	3.74	49.48	74	-24.52	peak
4804.026	40.02	3.74	43.76	54	-10.24	AVG
7206.026	43.12	8.14	51.26	74	-22.74	peak
7206.026	38.24	8.14	46.38	54	-7.62	AVG
Remark:						
Factor = Ante	nna Factor + Ca	able Loss – Pr	e-amplifier.			

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type		
4804.026	43.25	3.74	46.99	74	-27.01	peak		
4804.026	38.52	3.74	42.26	54	-11.74	AVG		
7206.026	42.05	8.14	50.19	74	-23.81	peak		
7206.026	37.12	8.14	45.26	54	-8.74	AVG		
Remark:								
Factor = Ante	Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

## Report No.: AGC07088160601FE08 Page 30 of 43

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type		
4880.026	46.33	3.76	50.09	74	-23.91	peak		
4880.026	41.25	3.76	45.01	54	-8.99	AVG		
7320.039	40.58	8.17	48.75	74	-25.25	peak		
7320.039	34.97	8.17	43.14	54	-10.86	AVG		
Remark:								
Factor = Ante	Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type		
4880.026	44.25	3.76	48.01	74	-25.99	peak		
4880.026	38.87	3.76	42.63	54	-11.37	AVG		
7320.039	40.12	8.17	48.29	74	-25.71	peak		
7320.039	33.87	8.17	42.04	54	-11.96	AVG		
Remark:								
Factor = Ante	Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

#### Report No.: AGC07088160601FE08 Page 31 of 43

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type		
4960.026	46.24	3.83	50.07	74	-23.93	peak		
4960.026	41.53	3.83	45.36	54	-8.64	AVG		
7440.039	42.57	8.21	50.78	74	-23.22	peak		
7440.039	37.36	8.21	45.57	54	-8.43	AVG		
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m) (dBµV/m)		value Type		
4960.026	44.17	3.83	48	74	-26	peak		
4960.026	39.08	3.83	42.91	54	-11.09	AVG		
7440.039	41.23	8.21	49.44	74	-24.56	peak		
7440.039	36.87	6.87 8.21 45.08		54	-8.92	AVG		
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

## RESULT: PASS

Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

All test modes had been pre-tested. The GFSK modulation is the worst case and recorded in the report.

## 12. BAND EDGE EMISSION

#### **12.1. MEASUREMENT PROCEDURE**

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

#### 12.2. TEST SET-UP

same as 11.2

#### Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level

2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.

3. The antenna A was the worst case and only the data of the worst case record in the test report.

#### 12.3. TEST RESULT

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

ΡK



AV



#### Report No.: AGC07088160601FE08 Page 34 of 43

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



AV

Keysight Spectrum Analyzer - Swept SA				- 6
larker 1 2.401986986987	CHZ PNO: Fast C	Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE A WWWW	Peak Search
0 dB/div Ref 106.99 dBµV	IFGain:Low #Atten: 10 dB	Mkr	1 2.401 99 GHz 92.069 dBµV	NextPea
97.0 87.0				Next Pk Rigl
77.0 67.0 57.0				Next Pk Le
47.0		¢ <sup>2</sup>		Marker Del
17.0			Stop 2 40500 GHz	Marker Der
Res BW 1.0 MHz	#VBW 3.0 MHz*	Sweep 1	.066 ms (1000 pts)	Mkr→C
2 N 1 f 2.39 3 4 5	9 GHZ 92.069 αBμV 0 00 GHz 28.774 dBμV			Mkr→RefL
0 7 8 9 9 0				<b>Мо</b> 1 о
	m		• •	

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



AV



#### Report No.: AGC07088160601FE08 Page 36 of 43

EUT	AES-BCM4343W-M1-G(AVNET BCM4343W SOC MODULE)	Model Name	AES-BCM-M1
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

ΡK



AV



## **13. FCC LINE CONDUCTED EMISSION TEST**

#### **13.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Frequency	Maximum RF Line Voltage			
Frequency	Q.P.( dBuV)	Average( dBuV)		
150kHz~500kHz	66-56	56-46		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

#### 13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



#### 13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.



#### 13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST LINE CONDUCTED EMISSION TEST LINE 1-L

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBu∨	O∨er Limit dB	Remark
1.	0.447	10.64	0.60	9.47	20.71	46.93	-26.22	Average
2.	0.447	10.64	0.60	18.47	29.71	56.93	-27.22	Peak <sup>-</sup>
3.	0.641	10.66	0.60	7.00	18.26	46.00	-27.74	Average
4.	0.641	10.66	0.60	14.00	25.26	56.00	-30.74	Peak
5.	0.948	10.67	0.60	3.46	14.73	46.00	-31.27	Average
6.	0.948	10.67	0.60	14.46	25.73	56.00	-30.27	Peak
7.	1.249	10.68	0.60	6.71	17.99	46.00	-28.01	Average
8.	1.249	10.68	0.60	15.71	26.99	56.00	-29.01	Peak
9.	1.388	10.68	0.60	4.77	16.05	46.00	-29.95	Average
10.	1.388	10.68	0.60	15.77	27.05	56.00	-28.95	Peak
11.	2.110	10.70	0.60	6.39	17.69	46.00	-28.31	Average
12.	2.110	10.70	0.60	15.39	26.69	56.00	-29.31	Peak



Line Conducted Emission Test Line 2-N

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Le∨el dBuV	Limit dBuV	O∨er Limit dB	Remark
1.	0.481	10.64	0.60	7.33	18.57	46.32	-27.75	Average
2.	0.481	10.64	0.60	16.33	27.57	56.32	-28.75	Peak
3.	0.641	10.66	0.60	3.57	14.83	46.00	-31.17	Average
4.	0.641	10.66	0.60	14.57	25.83	56.00	-30.17	Peak
5.	0.871	10.67	0.60	-1.67	9.60	46.00	-36.40	Average
6.	0.871	10.67	0.60	14.33	25.60	56.00	-30.40	Peak
7.	1.123	10.68	0.60	-0.98	10.30	46.00	-35.70	Average
8.	1.123	10.68	0.60	14.02	25.30	56.00	-30.70	Peak
9.	1.418	10.68	0.60	1.57	12.85	46.00	-33.15	Average
10.	1.418	10.68	0.60	13.57	24.85	56.00	-31.15	Peak
11.	1.781	10.69	0.60	-2.11	9.18	46.00	-36.82	Average
12.	1.781	10.69	0.60	13.89	25.18	56.00	-30.82	Peak



## **APPENDIX A: PHOTOGRAPHS OF TEST SETUP**



FCC LINE CONDUCTED EMISSION TEST SETUP



#### **APPENDIX B: PHOTOGRAPHS OF EUT**

----END OF REPORT----