

# **FCC Test Report**

Report No.: AGC01110180420FE04

**FCC ID** : 2AOKB-A3109

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION**: Soundcore Motion B

BRAND NAME : Soundcore

MODEL NAME : A3109

**CLIENT**: Anker Innovations Limited

**DATE OF ISSUE** : May 07, 2018

**STANDARD(S)** : FCC Part 15 Subpart C Section 15.247

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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# **Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	CO Process	May 07, 2018	Valid	Initial release

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# 1. VERIFICATION OF CONFORMITY

Applicant	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Manufacturer	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Product Designation	Soundcore Motion B
Brand Name	Soundcore
Test Model	A3109
Date of test	Apr. 22, 2018 to May 04, 2018
Deviation	None None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.247. The test results of this report relate only to the tested sample identified in this report.

Tested By		Honry	Zhang		
Clobal Complia.	Henry Zhan	g(Zhang Zl	huorui)	May 04,	2018
Reviewed By		and	chang		
® Milles attor of Colonia Consum	Cool Cheng(	Cheng Me	ngguo)	May 07,	2018
Approved By		Fore	st cei		
ionce (8) Milestation		i(Lei Yongo		May 07,	2018

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#### 2. GENERAL INFORMATION

# 2.1. PRODUCT DESCRIPTION

The EUT is "Soundcore Motion B" designed as a "Communication Device". It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

7111ajor tooriinoar accomptio	if of EOT is described as following
Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	2.54dBm(Max)
Bluetooth Version	V4.2
Modulation	GFSK, π /4-DQPSK, 8DPSK
Number of channels	79
Hardware Version	V0.3
Software Version	V2.9
Antenna Designation	Fixed Antenna
Antenna Gain	3dBi
Power Supply	DC 3.7V by battery

#### Note

- 1. The EUT didn't support BLE.
- 2. The USB port only used for charging and can't be used to transfer data with PC.

#### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Chann	el Number	Frequency		
EK Produce	Find Complance 8 5	O Cloops (S) Affectation of	2402MHz	CO	
(S) The state of Global Co.	and a	1	2403MHz	THE THE	
CC CC			## : O @	Find Clobal Company	
The state of the s	The Compliance	38	2440 MHz	Affesta	
2402~2480MHz	S Alles alon of clother	39	2441 MHz		
GC imm		40	2442 MHz	一手机	
	liti:	THE STATE OF THE S	ad Complaints	Allestation	
T TO THE REAL PROPERTY OF THE PARTY OF THE P	The Compliance of The Co.	77	2479 MHz		
® # Anthony of Ground Com	o' Allesia	78	2480 MHz	- FIN	

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#### 2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHZ,In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

#### 2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

#### 2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

- 1. LAP/UAP of the master of the connection.
- 2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire. LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations) are performed to generate te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always Differ from the first one.

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#### 2.6. TEST METHOD

All measurements contained in this report were conducted with ANSI C63.10-2013.

# 2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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#### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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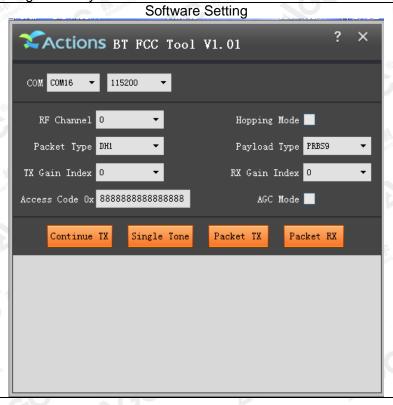


#### 4. DESCRIPTION OF TEST MODES

465		
	NO.	TEST MODE DESCRIPTION
KEZ JAN	1 1	Low channel GFSK
(B) #	2	Middle channel GFSK
GC	3	High channel GFSK
	4	Low channel π /4-DQPSK
爱 jion of Global	5 Francisco	Middle channel π /4-DQPSK
Alle	6	High channel π /4-DQPSK
	7	Low channel 8DPSK
(R) A	8 Charles	Middle channel 8DPSK
aG	9	High channel 8DPSK
	10	BT Link with charging
Mili:	11	BT Link

#### Note:

- 1. All the test modes can be supply by battery, 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.
- 3. The EUT used fully-charged battery when tested.



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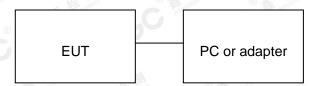


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# 5. SYSTEM TEST CONFIGURATION

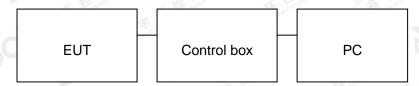
# **5.1. CONFIGURATION OF EUT SYSTEM**

Configure 1: (Normal hopping)



Note: Owing to the EUT has own battery, and testing may be performed while PC or adapter removed.

Configure 2: (Control continuous TX)



### **5.2. EQUIPMENT USED IN EUT SYSTEM**

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Soundcore Motion B	Soundcore	A3109	EUT
2	Battery	Giantsun Power	PA18	Accessory
3	PC	APPLE	A1465	A.E
4	Control box	SERIAL	N/A	A.E
5	Adapter	N/A	MX12X8-0502000UU	A.E.
6	AUX IN Cable	N/A	1m Unshielded	A.E
7	USB Cable	N/A	0.6m Unshielded	Accessory
8	USB Cable	N/A	1m Unshielded	A.E
9	IPOD	APPLE	A1367	A.E
10	Temporary Antenna	T10	N/A	A.E

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

DESCRIPTION OF TEST	RESULT	
Peak Output Power	Compliant	
20 dB Bandwidth	Compliant	
Conducted Spurious Emission	Compliant	
Radiated Emission	Compliant	
Band Edges	Compliant	
Number of hopping frequency	Compliant	
Time of Occupancy	Compliant	
Frequency Separation	Compliant	
Line conduction Emission	Compliant	
	Peak Output Power  20 dB Bandwidth  Conducted Spurious Emission  Radiated Emission  Band Edges  Number of hopping frequency  Time of Occupancy  Frequency Separation	

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# 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd			
Location  1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gus Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Cen Xixiang Inner Ring Road, Baoan District, Shenzhen 518012				
NVLAP Lab Code	600153-0			
Designation Number	CN5028			
Test Firm Registration Number	682566			
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0			

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#### 7. TEST EQUIPMENT LIST

# **TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

#### **TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 18, 2017	May 17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018
Radiation Cable 1	MXT	RS1	R005	June 6, 2017	June 5, 2018
Radiation Cable 2	MXT	RS1	R006	June 6, 2017	June 5, 2018
Loop Antenna	A.H.Systems,Inc	SAS-562B	- Kolobal Comp	Mar. 01, 2018	Feb. 28, 2019

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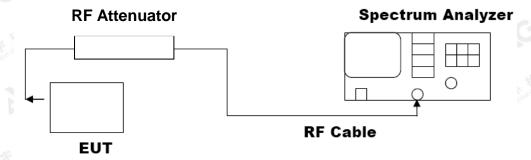
#### 8. PEAK OUTPUT POWER

#### **8.1. MEASUREMENT PROCEDURE**

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
- 3. RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW.
- 4. Record the maximum power from the Spectrum Analyzer.
- 5. The maximum peak power shall be less 21dBm.

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



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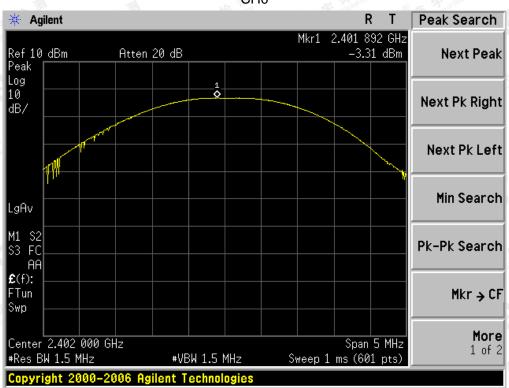




#### 8.3. LIMITS AND MEASUREMENT RESULT

	PEAK OUTPUT POWER	R MEASUREMENT RESULT	
	FOR GFSK I	MOUDULATION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	-3.31	21	Pass
2.441	-1.94	21	Pass
2.480	-0.73	21	Pass

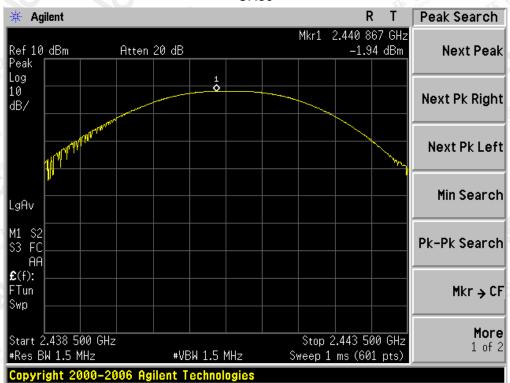
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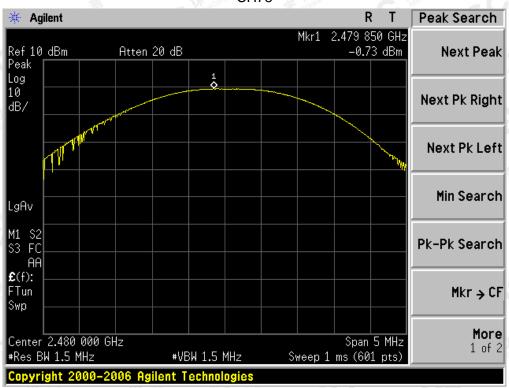
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#### **CH39**



#### **CH78**



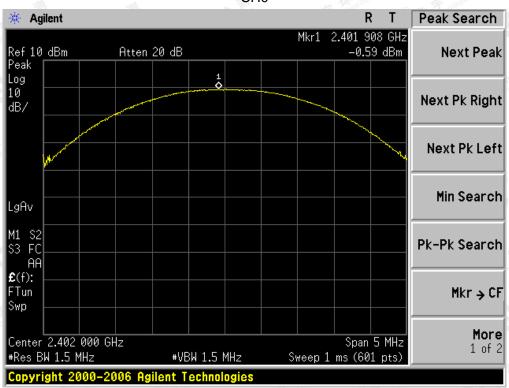
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	PEAK OUTPUT POWE	R MEASUREMENT RESULT	₹M ∴omm
	FOR ∏ /4-DG	PSK MODULATION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	-0.59	21	Pass
2.441	0.62	21	Pass
2.480	2.12	21	Pass

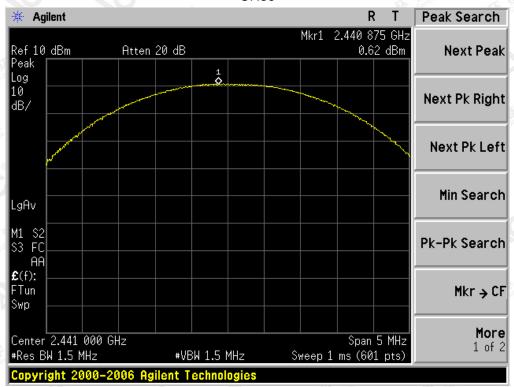
#### CH<sub>0</sub>



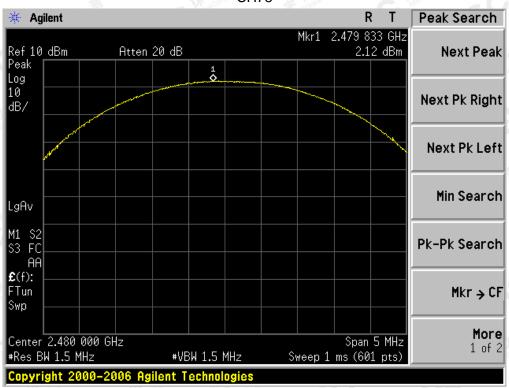
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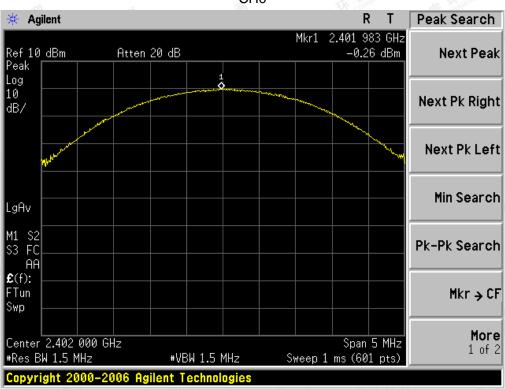
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	<b>PEAK OUTPUT POWE</b>	R MEASUREMENT RESULT	
	FOR 8DPSI	K MODULATION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	-0.26	21	Pass
2.441	1.09	21	Pass
2.480	2.54	21	Pass

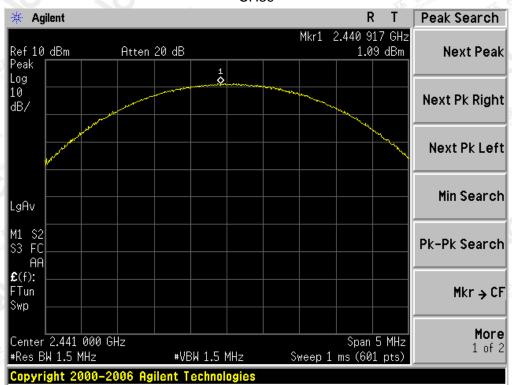
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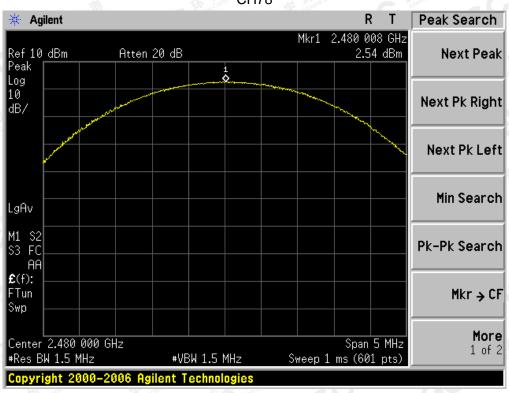
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#### **CH39**



# **CH78**



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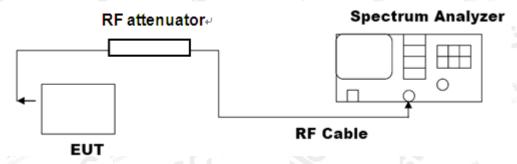
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# 9. BANDWIDTH

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port 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 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  3RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

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



Note: The EUT has been used temporary antenna connector for testing.

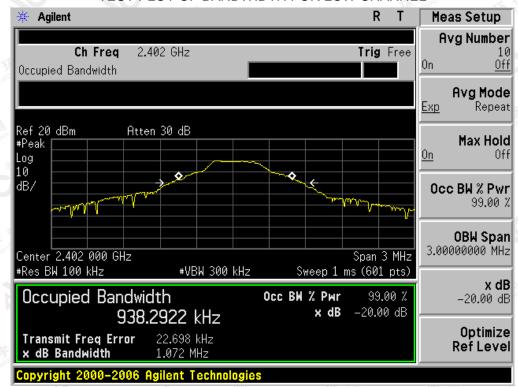
# 9.3. LIMITS AND MEASUREMENT RESULTS

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits		Test Data (MHz)		<b>5</b>	
		99%OBW (MHz)	-20dB BW(MHz)	Result	
O F A COURT COMPANY	Low Channel	0.938	1.072		PASS
N/A	Middle Channel	0.941	1.077	lift.	PASS TA TO THE PASS
	High Channel	0.931	1.070	TK ME Compliance	PASS

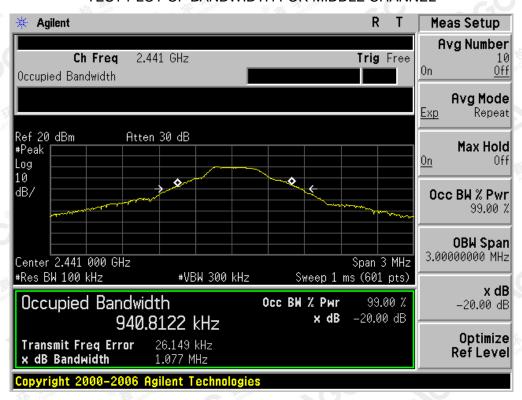
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#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



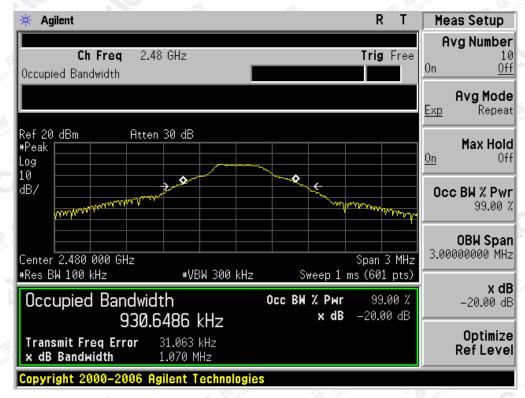
#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

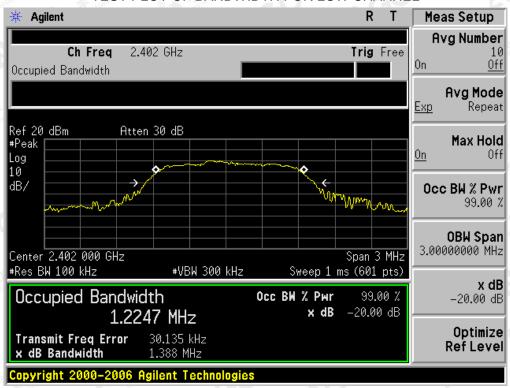


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	BLUETOOTH 2	MBPS LIMITS AN	D MEASUREMENT RES	ULT
		Me	asurement Result	
Applicable Limits		Test Data (MHz)		Dooule
		99%OBW (MHz)	-20dB BW(MHz)	Result
TA BOTTOM	Low Channel	1.225	1.388	PASS
N/A	Middle Channel	1.226	1.398	PASS
~GC	High Channel	1.225	1.390	PASS

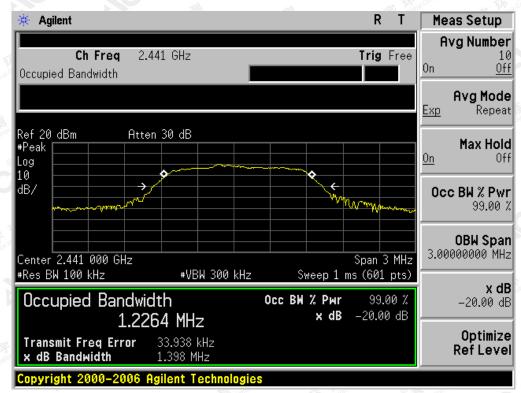
#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



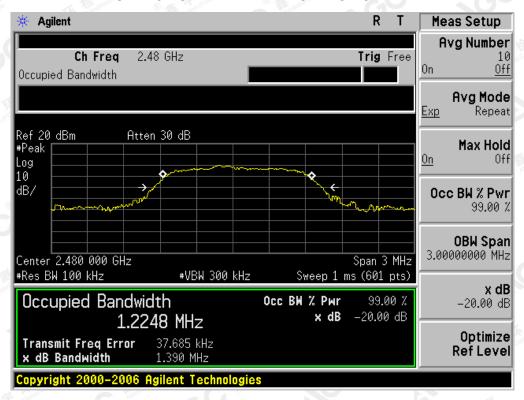
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

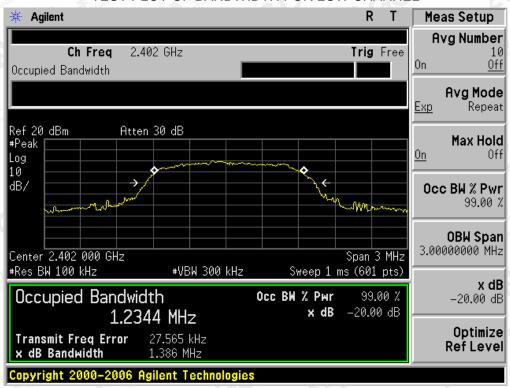


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	BLUETOOTH	3MBPS LIMITS AN	D MEASUREMENT RE	SULT
		Me	easurement Result	
Applicable Limits		Test Data (MHz	Door!f	
		99%OBW (MHz)	-20dB BW(MHz)	Result
不 だ ill	Low Channel	1.234	1.386	PASS
N/A	Middle Channel	1.227	1.394	PASS
	High Channel	1.233	1.402	PASS

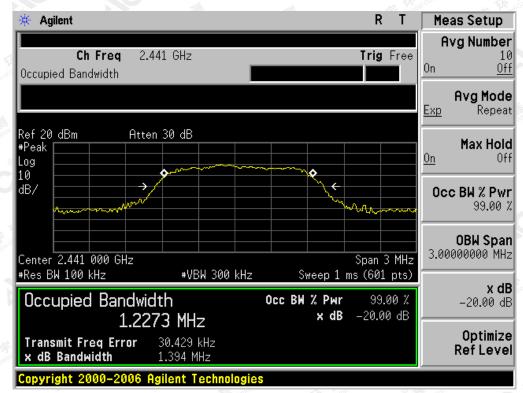
#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



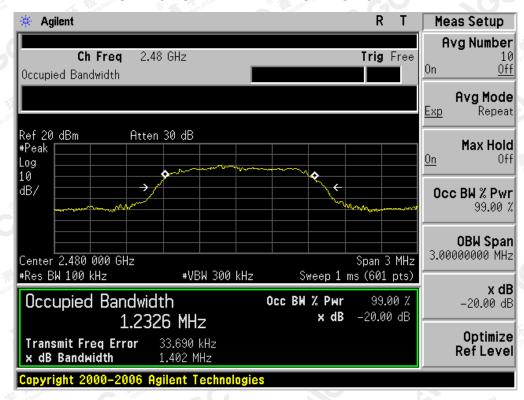
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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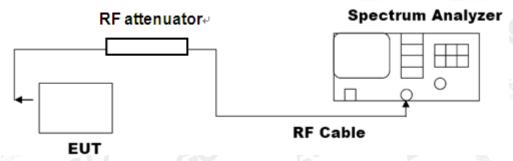
Report No.: AGC01110180420FE04 Page 29 of 75

### 10. CONDUCTED SPURIOUS EMISSION

#### 10.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions
  from the lowest frequency generated in the EUT up through the 10th harmonic.
  - RBW = 100 kHz; VBW = 300kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

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



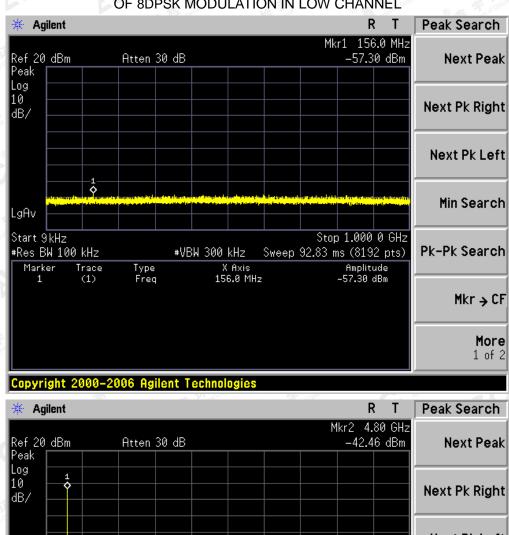
#### 10.3. LIMITS AND MEASUREMENT RESULT

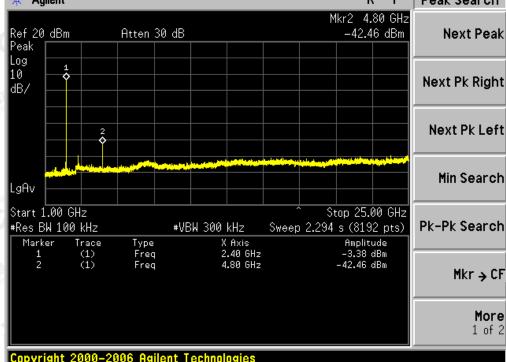
LIMITS AND MEASUREMENT RESULT			
Angliaghla Limita	Measurement Res	ult	
Applicable Limits	Test Data	Result	
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS	
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.  In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS	

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# TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL

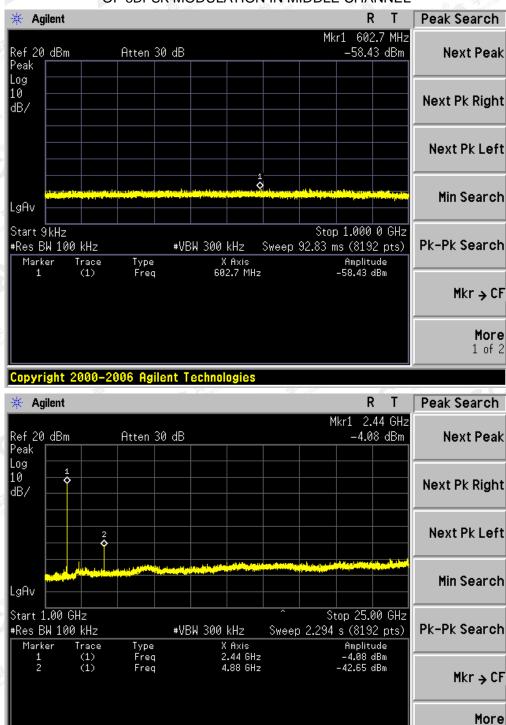




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# TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL



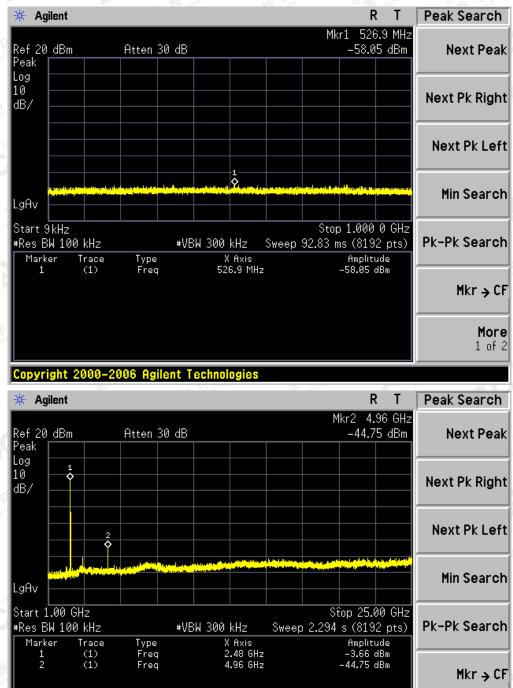
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1 of 2

More 1 of 2



# TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL



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### 11. RADIATED EMISSION

# 11.1. TEST LIMIT

Frequency	Distance	Field Strengths Limit	
(MHz)	Meters	μ V/m	dΒ(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	A The Com
0.490 ~ 1.705	30	24000/F(kHz)	
1.705 ~ 30	30	30	
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	在 3 环境	200	46.0
960 ~ 1000	3 Martin of Clour	500	54.0
Above 1000	3	Other:74.0 dB(µV)/m (Peak)	54.0 dB(µV)/m (Aver

Remark:

- (1) Emission level dB $\mu$  V = 20 log Emission level  $\mu$  V/m
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

#### 11.2. MEASUREMENT PROCEDURE

- 1. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- 2. The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- 3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- 4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 5. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)
- 6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak&AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

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The following table is the setting of spectrum analyzer and receiver.

	Spectrum Parameter	Setting
Clopal Count	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
CC Alles	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency		1GHz~26.5GHz RBW 1MHz/ VBW 3MHz for Peak, RBW 1MHz/ VBW 10Hz for Average

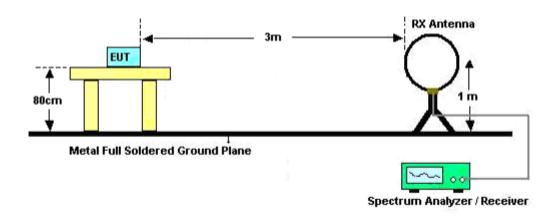
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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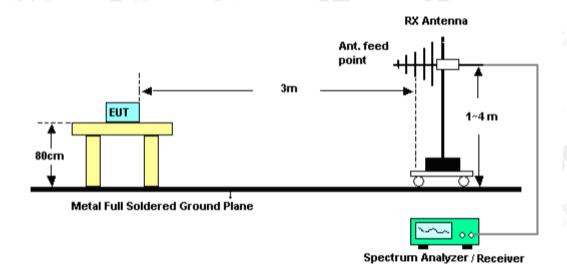


#### 11.3. TEST SETUP

#### RADIATED EMISSION TEST SETUP BELOW 30MHz



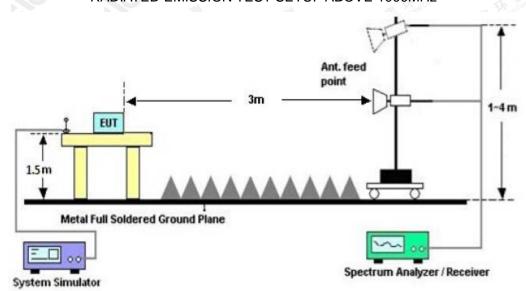
#### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



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# RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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## 11.4. TEST RESULT

(Worst Modulation: 8DPSK)

## **RADIATED EMISSION BELOW 30MHz**

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

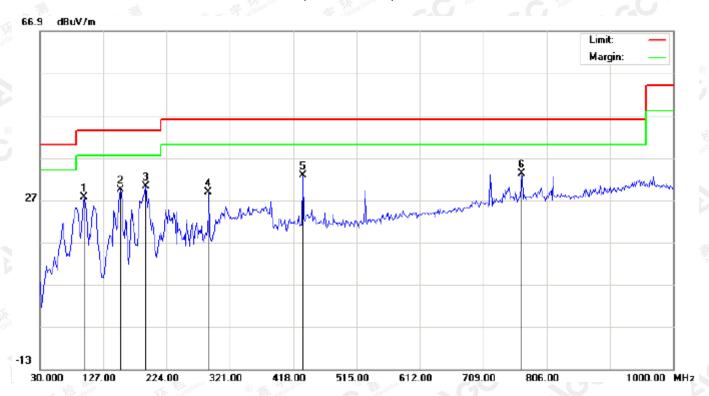
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## **RADIATED EMISSION BELOW 1GHz**

## RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBu√/m	dB		cm	degree	
1		97.9000	19.20	8.38	27.58	43.50	-15.92	peak			
2		152.8667	17.27	12.07	29.34	43.50	-14.16	peak			
3		191.6667	18.68	11.61	30.29	43.50	-13.21	peak			
4		288.6666	15.39	13.48	28.87	46.00	-17.13	peak			
5		432.5500	12.67	20.06	32.73	46.00	-13.27	peak			
6	*	767.2000	6.33	26.87	33.20	46.00	-12.80	peak			

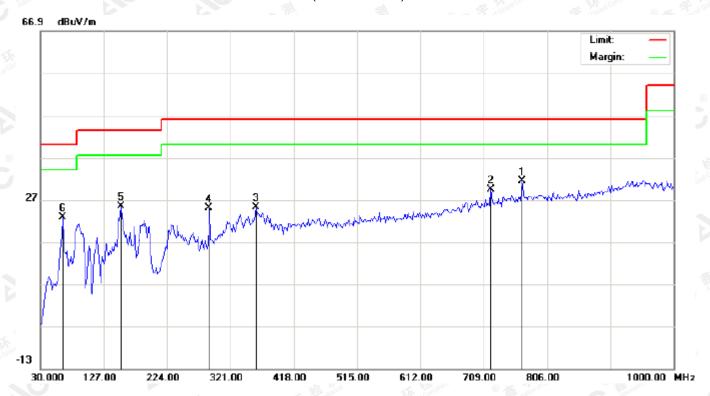
RESULT. PASS

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# RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERTICAL



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB		cm	degree	
1	*	767.2000	4.48	26.87	31.35	46.00	-14.65	peak			
2		720.3167	3.56	25.78	29.34	46.00	-16.66	peak			
3		359.8000	6.45	18.80	25.25	46.00	-20.75	peak			
4		288.6666	9.87	15.07	24.94	46.00	-21.06	peak			
5		152.8667	10.09	15.28	25.37	43.50	-18.13	peak			
6		63.9500	16.20	6.61	22.81	40.00	-17.19	peak			

## **RESULT: PASS**

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

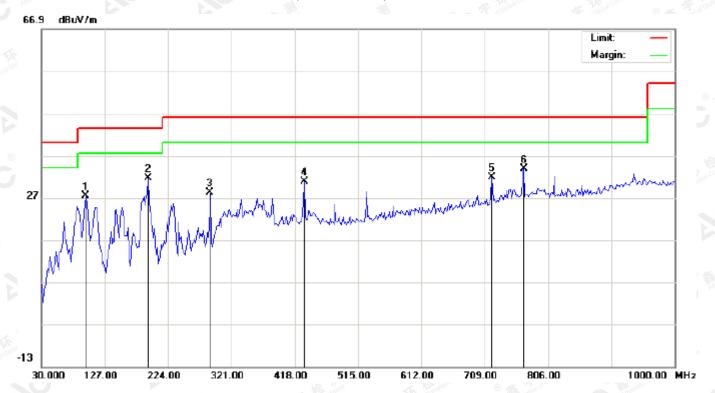
2. The "Factor" value can be calculated automatically by software of measurement system.

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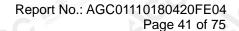
## RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL



1	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		-	MHz	dBu∀	dB/m	dBu\//m	dBu√/m	dB		cm	degree	
Γ	1		97.9000	19.07	8.38	27.45	43.50	-16.05	peak			
Γ	2	*	193.2833	19.96	11.69	31.65	43.50	-11.85	peak			
Γ	3		288.6666	14.70	13.48	28.18	46.00	-17.82	peak			
Γ	4		432.5500	10.71	20.06	30.77	46.00	-15.23	peak			
Æ	5		720.3167	6.08	25.79	31.87	46.00	-14.13	peak			
	6		768.8167	6.84	26.89	33.73	46.00	-12.27	peak			

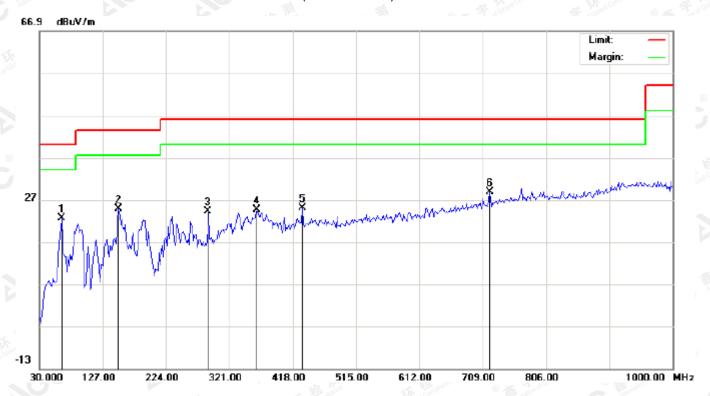
**RESULT: PASS** 

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# RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL -VERTICAL



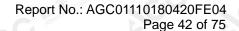
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
<b>X</b>	-	MHz	dBu∀	dB/m	dBuV/m	dBu∀/m	dB		cm	degree	
1		63.9500	16.02	6.61	22.63	40.00	-17.37	peak			
2		151.2500	9.50	15.27	24.77	43.50	-18.73	peak			
3		288.6666	9.19	15.07	24.26	46.00	-21.74	peak			
4		363.0333	5.73	18.83	24.56	46.00	-21.44	peak			
5		432.5500	4.99	20.06	25.05	46.00	-20.95	peak			
6	*	720.3167	3.11	25.78	28.89	46.00	-17.11	peak			

## **RESULT: PASS**

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

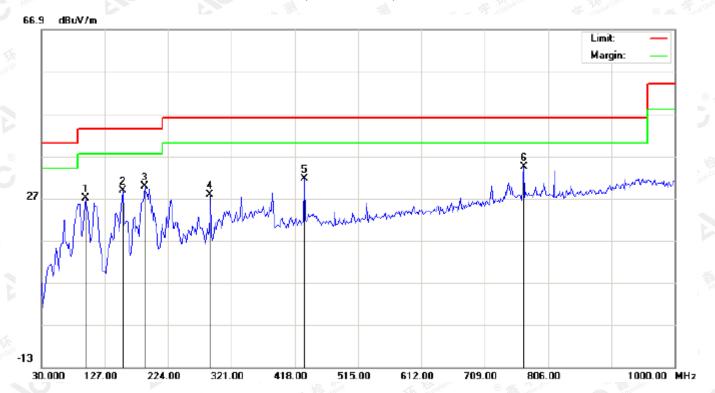
2. The "Factor" value can be calculated automatically by software of measurement system.

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## RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL



No	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
8	-	MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB		cm	degree	
1		97.9000	18.68	8.38	27.06	43.50	-16.44	peak			
2		154.4832	17.19	11.67	28.86	43.50	-14.64	peak			
3		188.4333	18.42	11.46	29.88	43.50	-13.62	peak			
4		288.6666	14.29	13.48	27.77	46.00	-18.23	peak			
5		432.5500	11.49	20.06	31.55	46.00	-14.45	peak		·	
6	*	768.8167	7.43	26.89	34.32	46.00	-11.68	peak			

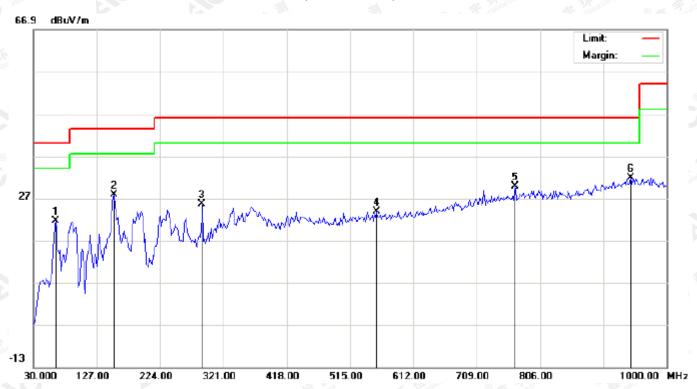
**RESULT: PASS** 

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# RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL -VERTICAL



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
<b>4</b>	-	MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB		cm	degree	
1		63.9500	14.97	6.61	21.58	40.00	-18.42	peak			
2		152.8667	12.52	15.28	27.80	43.50	-15.70	peak			
3		288.6666	10.49	15.07	25.56	46.00	-20.44	peak			
4		555.4167	1.35	22.51	23.86	46.00	-22.14	peak			
5		767.2000	2.99	26.87	29.86	46.00	-16.14	peak			
6	*	945.0333	1.94	29.86	31.80	46.00	-14.20	peak			

## **RESULT: PASS**

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

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

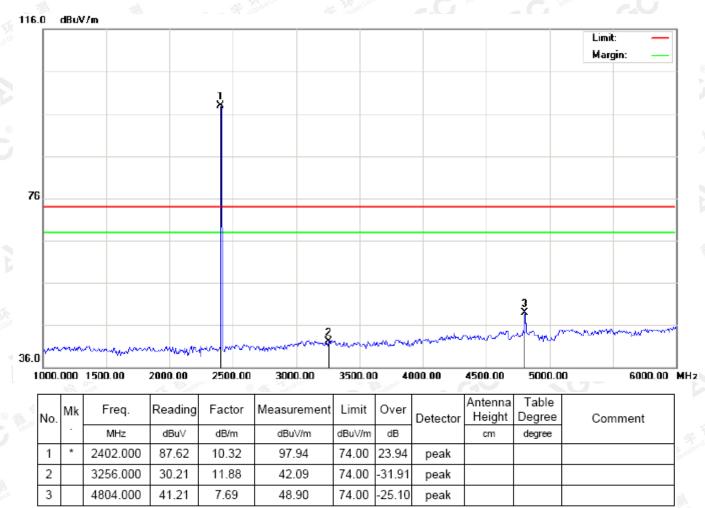
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## **RADIATED EMISSION ABOVE 1GHz**

## RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics)-LOW CHANNEL-HORIZONTAL



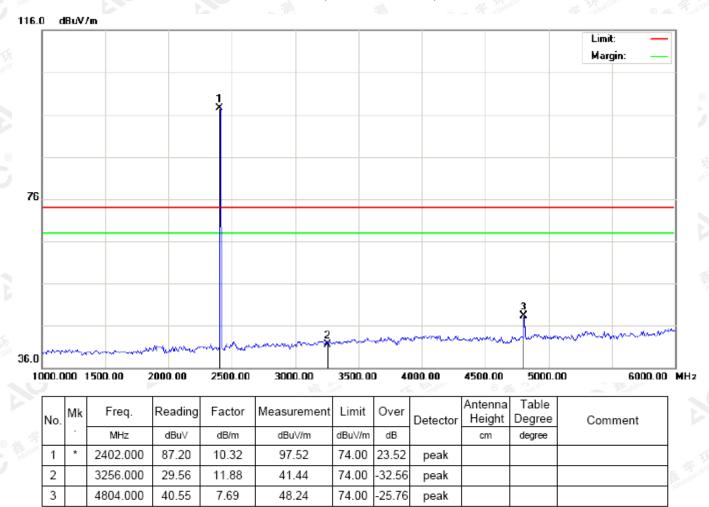
**RESULT: PASS** 

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# RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics)-LOW CHANNEL -VERTICAL



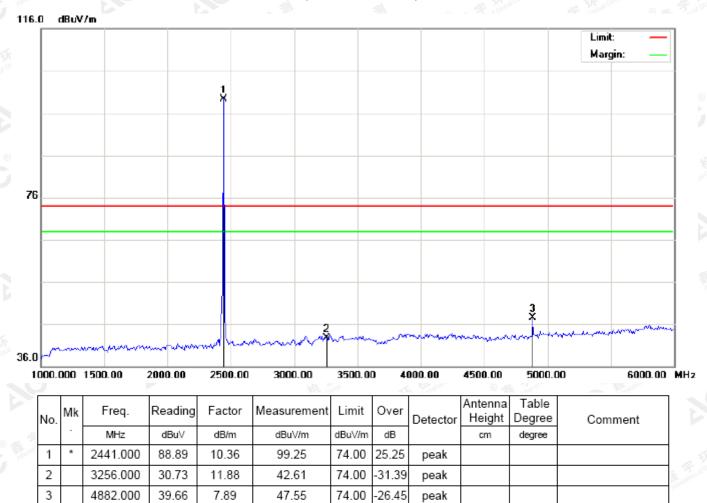
**RESULT: PASS** 

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## RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics)-MIDDLE CHANNEL-HORIZONTAL



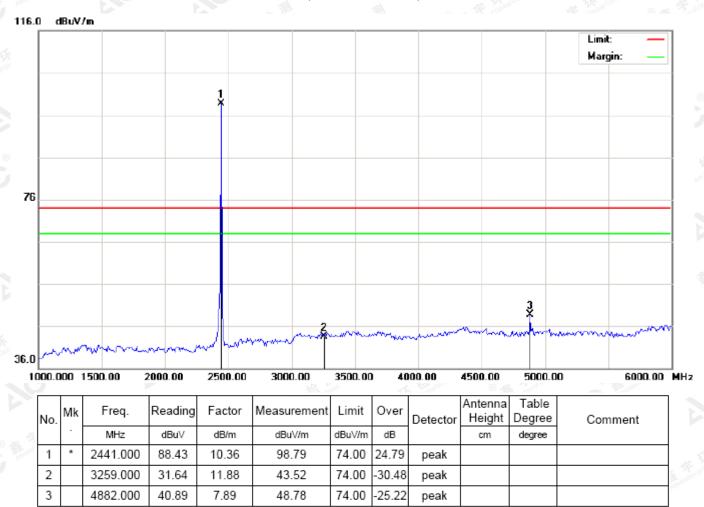
**RESULT: PASS** 

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## RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics) - MIDDLE CHANNEL -VERTICAL



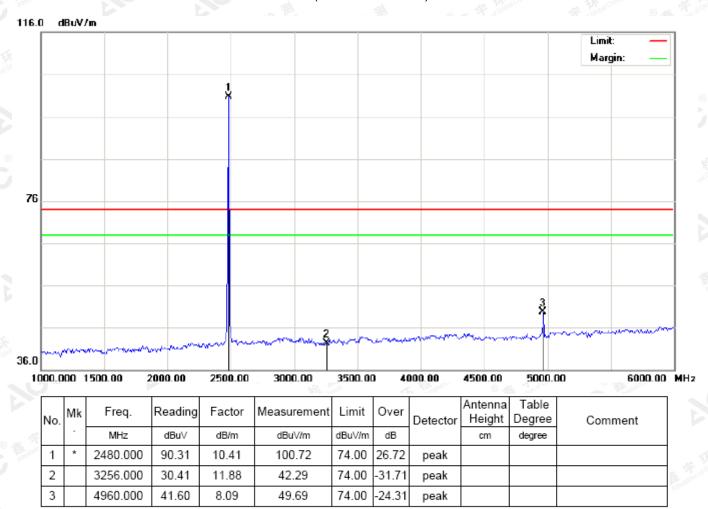
**RESULT: PASS** 

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## RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics)-HIGH CHANNEL-HORIZONTAL



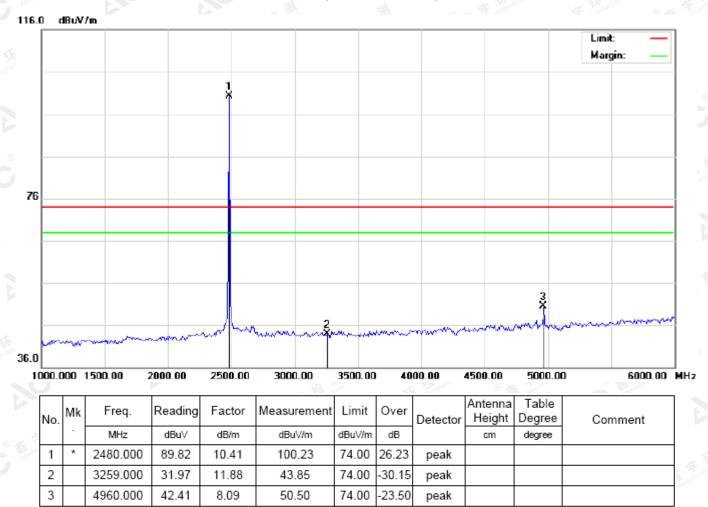
**RESULT: PASS** 

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## RADIATED EMISSION ABOVE 1GHz (1-10<sup>th</sup> Harmonics)-HIGH CHANNEL -VERTICAL



## **RESULT: PASS**

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

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

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

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## 12. BAND EDGE EMISSION

## 12.1. MEASUREMENT PROCEDURE

- 1. Set the EUT Work on the top, the bottom operation frequency individually.
- 2. Set SPA Start or Stop Frequency=Operation Frequency,

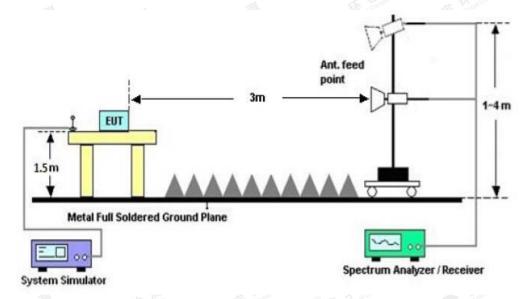
For unrestricted band: RBW=100kHz, VBW=300kHz

For restricted band: RBW=1MHz, VBW=3\*RBW

Center frequency = Operation frequency

3. The band edges was measured and recorded.

#### 12.2. TEST SET-UP



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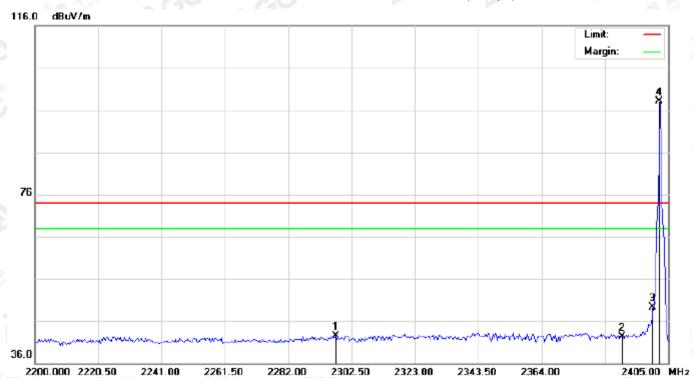




## 12.3. TEST RESULT

(Worst Modulation: 8DPSK)

## TEST PLOT OF BAND EDGE FOR LOW CHANNEL (3Mbps)-Horizontal



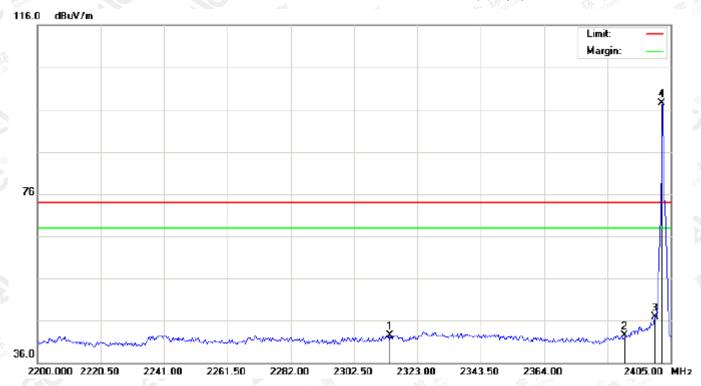
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	,	MHz	dBu∀	dB/m	dBu\//m	dBu∀/m	dB		cm	degree	
1		2297.375	32.28	10.21	42.49	74.00	-31.51	peak			
2		2390.000	32.00	10.31	42.31	74.00	-31.69	peak			
3		2400.000	38.97	10.32	49.29	74.00	-24.71	peak			
4	*	2402.000	87.72	10.32	98.04	74.00	24.04	peak			

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## TEST PLOT OF BAND EDGE FOR LOW CHANNEL (3Mbps)-Vertical



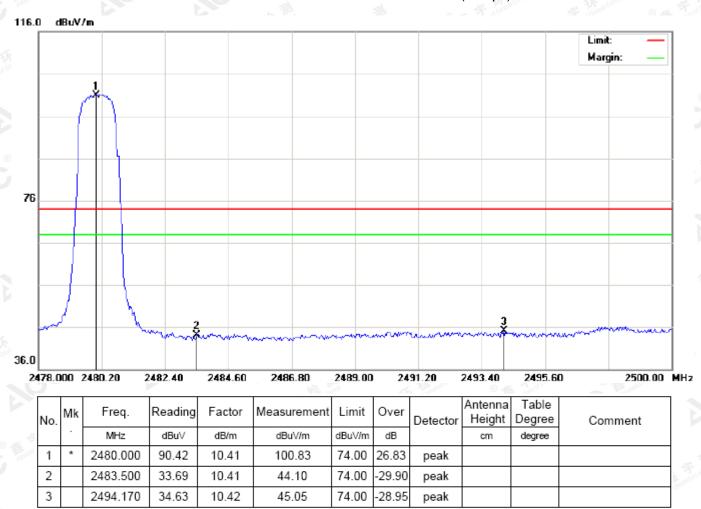
	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
2			MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB		cm	degree	
	1		2314.116	32.27	10.23	42.50	74.00	-31.50	peak			
ſ	2		2390.000	32.21	10.31	42.52	74.00	-31.48	peak			
ſ	3		2400.000	36.56	10.32	46.88	74.00	-27.12	peak			
	4	*	2402.000	87.09	10.32	97.41	74.00	23.41	peak			

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## TEST PLOT OF BAND EDGE FOR HIGH CHANNEL (3Mbps)-Horizontal

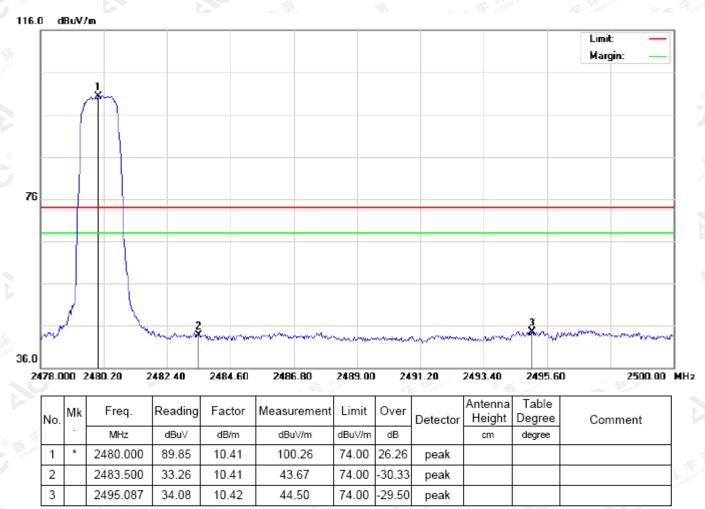


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## TEST PLOT OF BAND EDGE FOR HIGH CHANNEL (3Mbps)-Vertical



## **RESULT: PASS**

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

- 2. The "Factor" value can be calculated automatically by software of measurement system.
- 3. Hopping off and Hopping on have been tested and only worst case recorded

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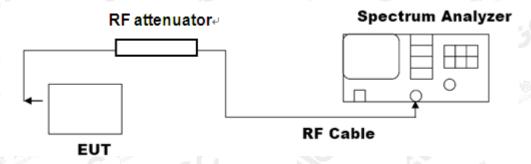
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## 13. NUMBER OF HOPPING FREQUENCY

#### 13.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
- 4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=3RBW.

## 13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



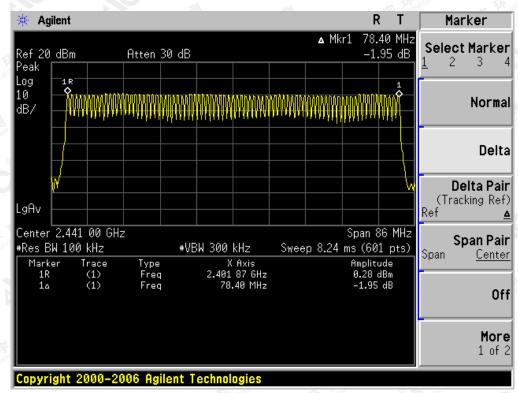
#### 13.3. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
HOPPING CHANNEL	>=15	79	PASS

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## TEST PLOT FOR NO. OF TOTAL CHANNELS



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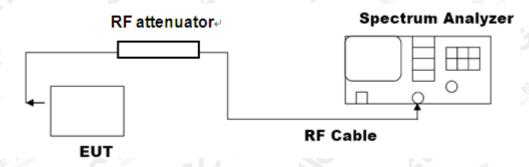
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# 14. TIME OF OCCUPANCY (DWELL TIME)

## 14.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the
- 3. Set Span = zero span, centered on a hoping channel
- 4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz

## 14.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



#### 14.3. LIMITS AND MEASUREMENT RESULT

The Worst Case (3Mbps)

Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.870	31.6	306.13	400
Middle	2.842	31.6	303.15	400
High	2.842	31.6	303.15	400

Low Channel Time

2.870\*(1600/6)/79\*31.6=306.13ms

Middle Channel Time

2.842\*(1600/6)/79\*31.6=303.15ms

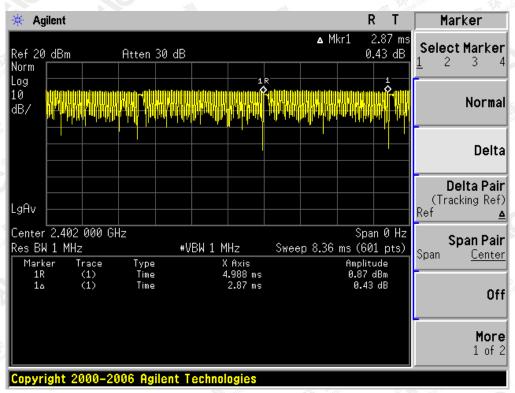
**High Channel Time** 

2.842\*(1600/6)/79\*31.6=303.15ms

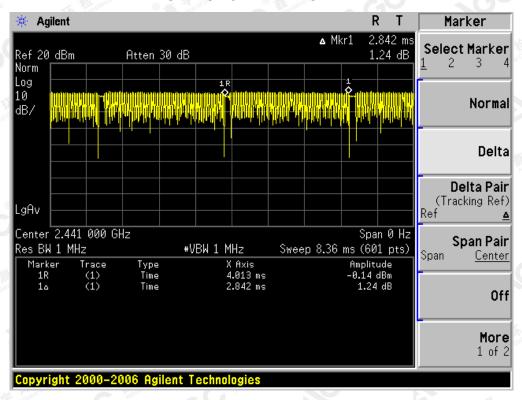
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#### TEST PLOT OF LOW CHANNEL



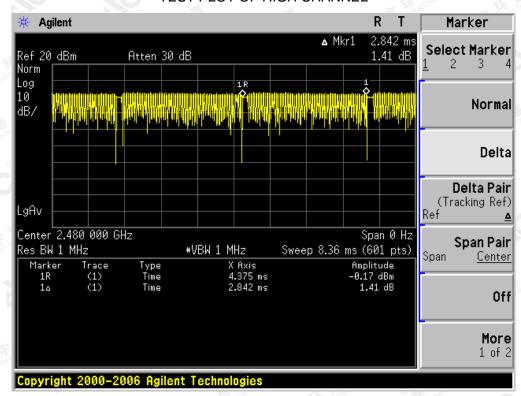
#### TEST PLOT OF MIDDLE CHANNEL



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## TEST PLOT OF HIGH CHANNEL



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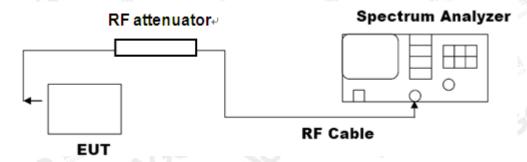
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## 15. FREQUENCY SEPARATION

## 15.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
- 3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

## 15.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



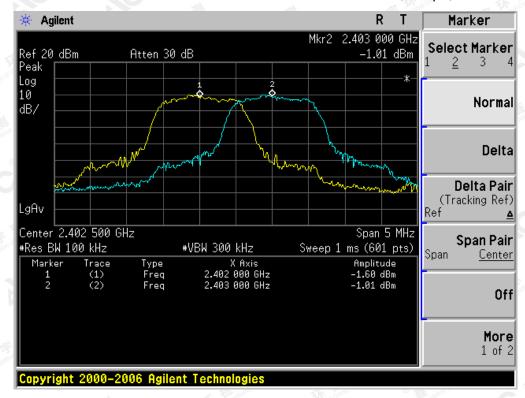
## 15.3. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT		
	KHz	KHz			
CH00-CH01	1000	>=25 KHz or 2/3 20 dB BW	Pass		

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## TEST PLOT FOR FREQUENCY SEPARATION (3Mbps)



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## 16. LINE CONDUCTED EMISSION TEST

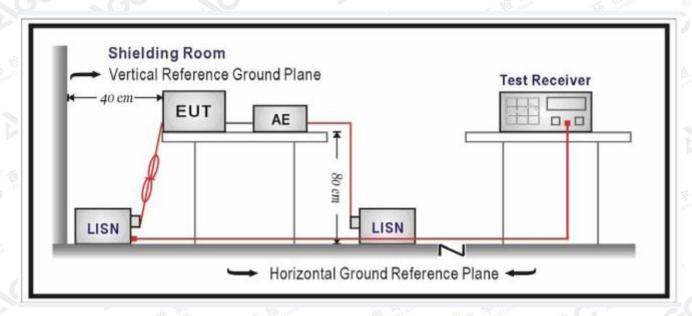
## 16.1. LIMITS OF LINE CONDUCTED EMISSION TEST

F	Maximum RF Line Voltage						
Frequency	Q.P.( dBuV)	Average( dBuV)					
150kHz~500kHz	66-56	56-46					
500kHz~5MHz	56 A Common Service C	46 M					
5MHz~30MHz	060	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

## 16.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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## 16.3. 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 power by adapter or PC 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.

## 16.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2. 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.

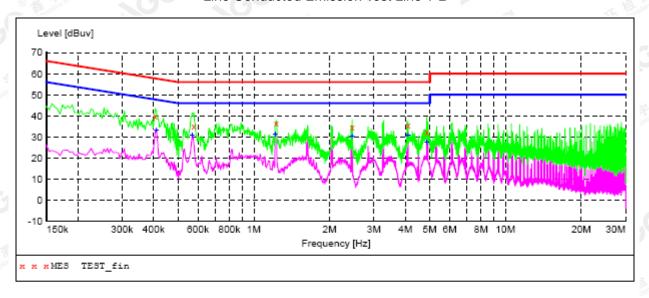
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## 16.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

## By adapter(worst case)

## Line Conducted Emission Test Line 1-L



#### MEASUREMENT RESULT: "TEST fin"

2018/4/27	19.46

•	710/1/2/ 17:	10						
	Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
	0.406000	39.70	10.1	58	18.0	QP	L1	FLO
	0.578000	35.30	10.1	56	20.7	QP	L1	FLO
	1.230000	36.40	10.2	56	19.6	QP	L1	FLO
	2.458000	34.70	10.0	56	21.3	QP	L1	FLO
	4.098000	35.60	10.2	56	20.4	QP	L1	FLO
	4.870000	32.30	10.3	56	23.7	QP	L1	FLO

## MEASUREMENT RESULT: "TEST fin2"

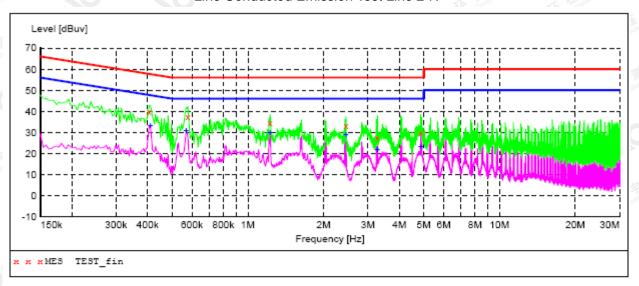
2018/4/27 19:46

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.410000	33.40	10.1	48	14.2	AV	L1	FLO
0.570000	30.80	10.1	46	15.2	AV	L1	FLO
1.218000	31.40	10.2	46	14.6	AV	L1	FLO
2.458000	30.30	10.0	46	15.7	AV	L1	FLO
4.098000	30.60	10.2	46	15.4	AV	L1	FLO
4.870000	27.30	10.3	46	18.7	AV	L1	FLO

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## Line Conducted Emission Test Line 2-N



### MEASUREMENT RESULT: "TEST fin"

2018/4/27 19:42

2010/4/2/ 19:	72						
Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.406000	39.90	10.1	58	17.8	QP	N	FLO
0.578000	37.50	10.1	56	18.5	QP	N	FLO
1.226000	34.60	10.2	56	21.4	QP	N	FLO
2.454000	33.20	10.0	56	22.8	QP	N	FLO
3.270000	27.30	10.0	56	28.7	QP	N	FLO
4.862000	29.90	10.3	56	26.1	QP	N	FLO

## MEASUREMENT RESULT: "TEST fin2"

2018/4/27 19:42

2018/4/27 19:	42						
Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.410000	33.10	10.1	48	14.5	AV	N	FLO
0.570000	30.80	10.1	46	15.2	AV	N	FLO
1.226000	29.80	10.2	46	16.2	AV	N	FLO
2.454000	28.80	10.0	46	17.2	AV	N	FLO
3.270000	21.60	10.0	46	24.4	AV	N	FLO
4.862000	23.30	10.3	46	22.7	AV	N	FLO

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## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP

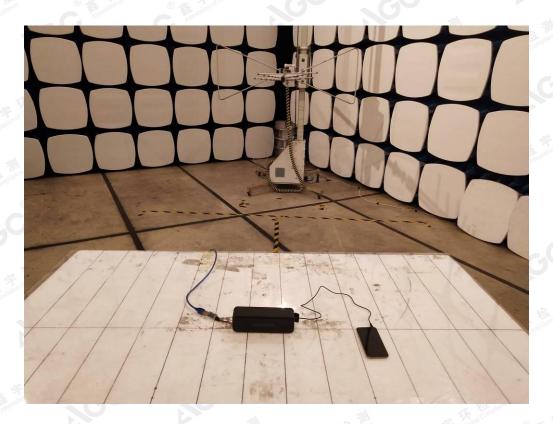


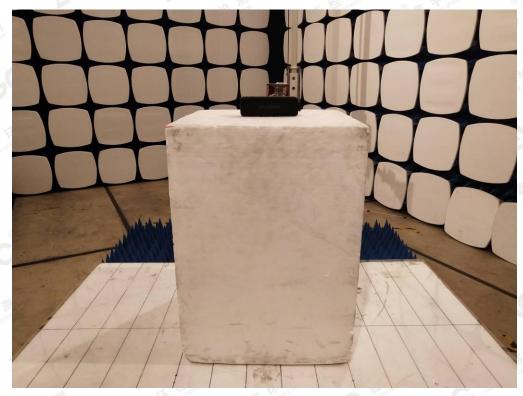
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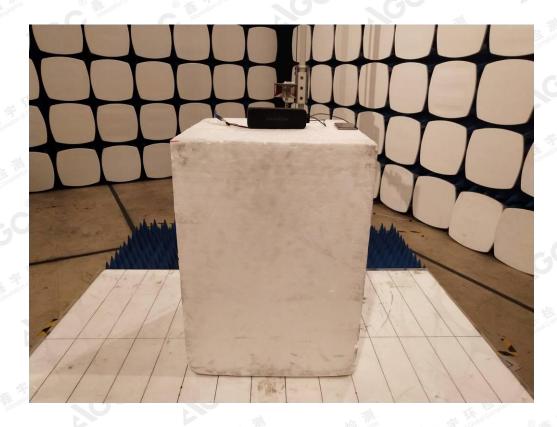
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## APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



TOP VIEW OF EUT



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## **BOTTOM VIEW OF EUT**



FRONT VIEW OF EUT



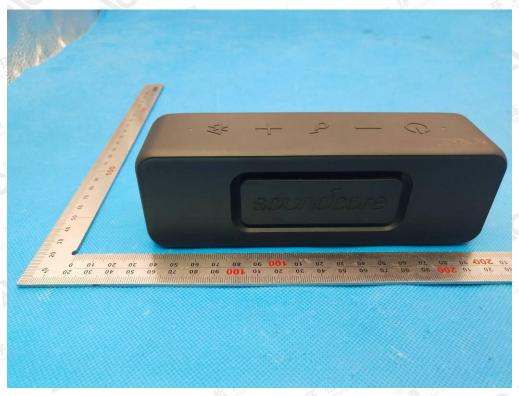
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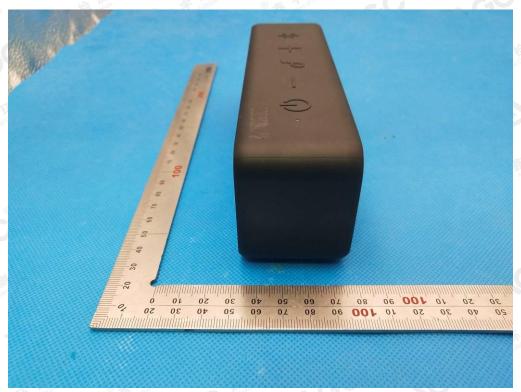
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## **BACK VIEW OF EUT**



LEFT VIEW OF EUT



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## RIGHT VIEW OF EUT



VIEW OF EUT (PORT)



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# OPEN VIEW OF EUT



#### **VIEW OF BATTERY**



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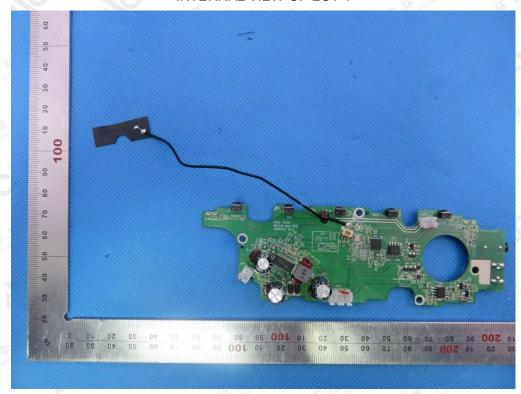
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AGC 8

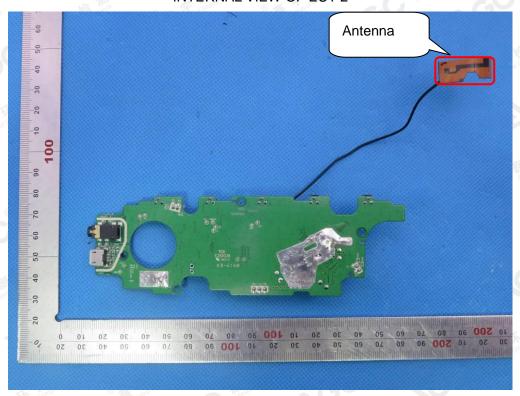
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## **INTERNAL VIEW OF EUT-1**



## **INTERNAL VIEW OF EUT-2**



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## **INTERNAL VIEW OF EUT-3**



-END OF REPORT--

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