# NTEK 北测<sup>®</sup>



#### Report No.: S22042602802001

## 7.8 CONDUCTED BAND EDGE MEASUREMENT

## 7.8.1 Applicable Standard

According to FCC Part 15.247(d) and ANSI C63.10-2013

## 7.8.2 Conformance Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.205(c)).

## 7.8.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

## 7.8.4 Test Setup

Please refer to Section 6.1 of this test report.

## 7.8.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.6.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW = 100KHz

VBW = 300KHz

Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.

Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

Repeat above procedures until all measured frequencies were complete.





## 7.8.6 Test Results

EUT:	Security control panel	Model No.:	Ajax Hub 2 (4G) (9NA/AFA)
Temperature:	<b>20</b> ℃	Relative Humidity:	48%
Test Mode:	Mode2 /Mode4/ Mode5	Test By:	Susan Li

(Module1)OCW=120K-Antenna1

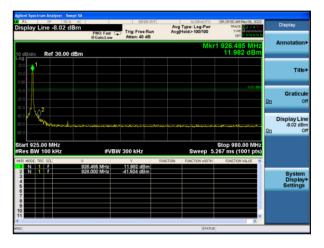
## **Test Plot**

## GFSK: Band Edge-Low Channel

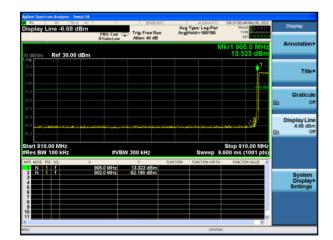
splay Line -6.50 dBm	PNO: East	servse:avrt A g: Free Run Av ten: 40 dB	ALIGNAUTO vg Type: Log-Pwr vg Hold>100/100	09:40:25 AM May 06, 2022 TRACE 2 3 4 5 6 TYPE MANNIN N	Display
0 dB/div Ref 30.00 dBm	IFGain:Low A		М	kr1 905.0 MHz 13.496 dBm	Annotation
				•1-	Titl
				4 50 dBm	Gratic:
	angunadar yaya da kasanda			Q^2/	Display L -6.50 d On
tart 810.00 MHz Res BW 100 kHz	#VBW 300	kHz	Sweep 9.	Stop 910.00 MHz 600 ms (1001 pts)	
KRIMODE TRC SEL X		FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 F 3 4 5	902.0 MHz -49.	236 dBm			Syste Displa Setting
6 7 8 9					
i i i i i i i i i i i i i i i i i i i					

## GFSK: Band Edge-Low Channel (Hopping Mode)

## GFSK: Band Edge-High Channel



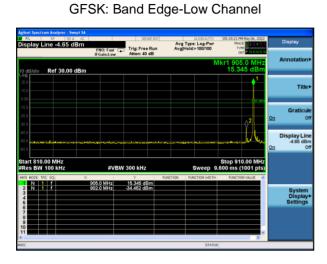
## GFSK: Band Edge-High Channel (Hopping Mode)





#### Report No.: S22042602802001

(Module1)OCW=120K-Antenna2



GFSK: Band Edge-High Channel

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**Test Plot** 



GFSK: Band Edge-High Channel

(Hopping Mode)

GFSK: Band Edge-Low Channel (Hopping Mode)

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Aglend Agestrian Analyzer - Sept 13. Display Line -5.55 dBm Figure 1, and the set of t





EUT:	Security control panel	Model No.:	Ajax Hub 2 (4G) (9NA/AFA)
Temperature:	<b>20</b> °C	Relative Humidity:	48%
Test Mode:	Mode2 /Mode4/ Mode5	Test By:	Susan Li

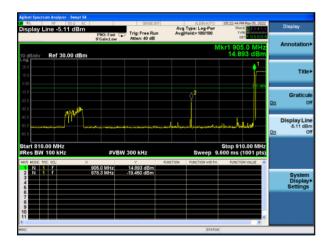
(Module2)OCW=140K-Antenna3

## Test Plot

## GFSK: Band Edge-Low Channel

		PNO: Fast	Trig: Free Ru Atten: 40 dB	n Avg	Type: Log-Pwr Hold>100/100	TRACE 2345 TYPE MUSERAN DET PNNNN	Display
0 dB/div	Ref 30.00 dBr	n			N	lkr1 905.0 MHz 15.065 dBm	Annotation
.og 20.0 10.0							Titl
20.0							Gratic On
40.0 60.0		un ter nyakalak kanatate			Anne 1994 - 1995 - 1995 - 1995 - 1995	Q <sup>2</sup>	Display Li -4.93 di <u>On</u>
Start 810. Res BW		#VE	300 kHz		Sweep 9	Stop 910.00 MHz 600 ms (1001 pts)	
KR MODE TR	RC SCL	× 905.0 MHz	۲ 15.065 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 3 4 6	f	902.0 MHz	-52.028 dBm				Syster Displa Setting
6 7 8 9							

## GFSK: Band Edge-Low Channel (Hopping Mode)



## GFSK: Band Edge-High Channel

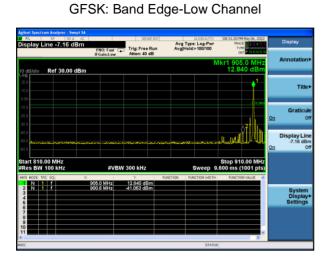


## GFSK: Band Edge-High Channel (Hopping Mode)

isplay Line -6.52 dBm	PNO: Fast	SENSE:INT Trig: Free Run Atten: 40 dB	Avg Type: Log-Pwr Avg Hold>100/100	05:10:35 PM May 05, 2022 TRACE 2 2 4 5 0 TVPE M	Display
dB/div Ref 30.00 dBm	IFGain:Low	Atten: 40 dB	Mkr	1 925.495 MHz 13.477 dBm	Annotation
					Title
000 0.0 0.0 0.0				-6 12 dBg	Graticu 2n C
	ol	at	***		Display Lin -6.52 dB On O
tart 925.00 MHz Res BW 100 kHz	#VB	W 300 kHz	Sweep 5	Stop 980.00 MHz 267 ms (1001 pts)	
KR MODE TRC SCL X	25.495 MHz	۲ 13.477 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 f 9 3 4 5 5	28.355 MHz	-15.618 dBm			System Display Settings
6 7 8 9					

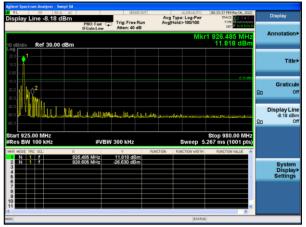
#### Report No.: S22042602802001

(Module2)OCW=140K-Antenna4



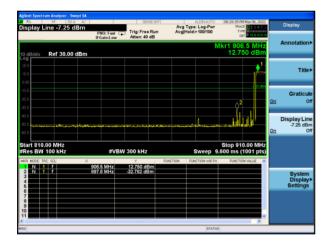
Test Plot GFSK: Band Edge-High Channel

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GFSK: Band Edge-Low Channel (Hopping Mode)

GFSK: Band Edge-High Channel (Hopping Mode)









## 7.9 SPURIOUS RF CONDUCTED EMISSION

## 7.9.1 Applicable Standard

According to FCC Part 15.247(d) and ANSI C63.10-2013.

## 7.9.2 Conformance Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### 7.9.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.9.4 Test Setup

Please refer to Section 6.1 of this test report.

## 7.9.5 Test Procedure

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.

- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq$  [3 × RBW].
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level.

Then the limit shall be attenuated by at least 20 dB relative to the maximum amplitude level in 100 kHz.

## 7.9.6 Test Results

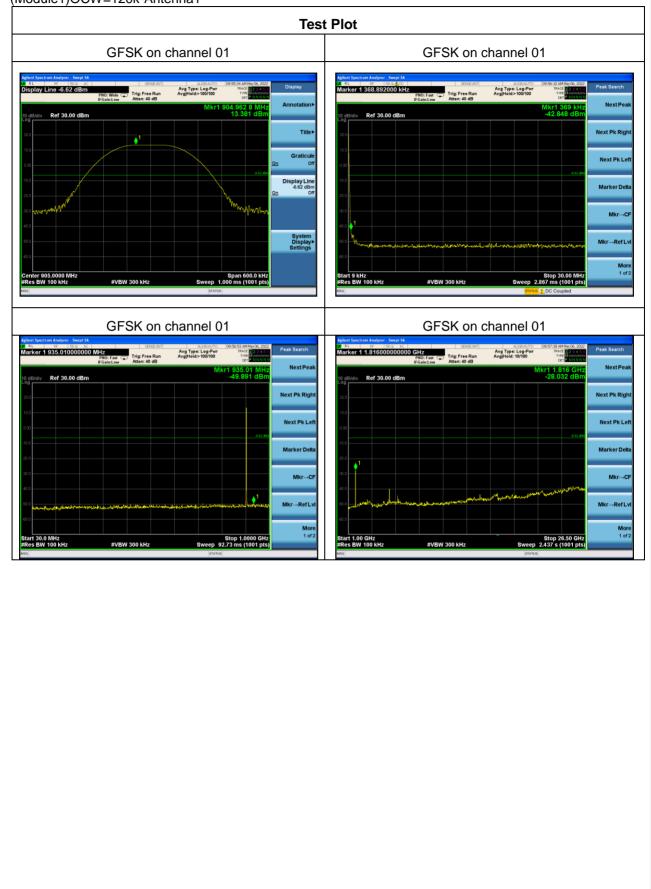
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.



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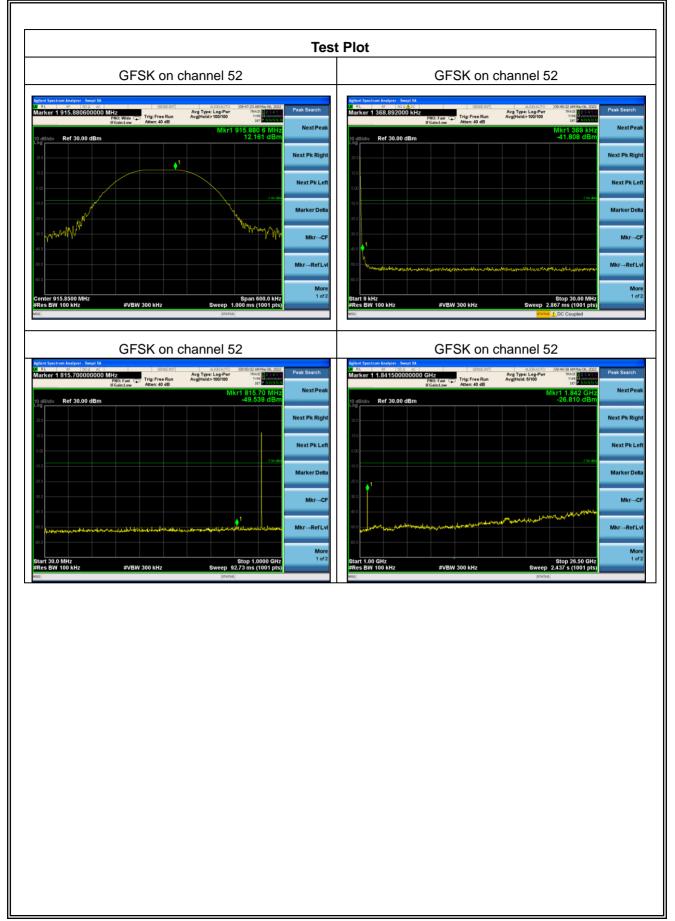


(Module1)OCW=120k-Antenna1





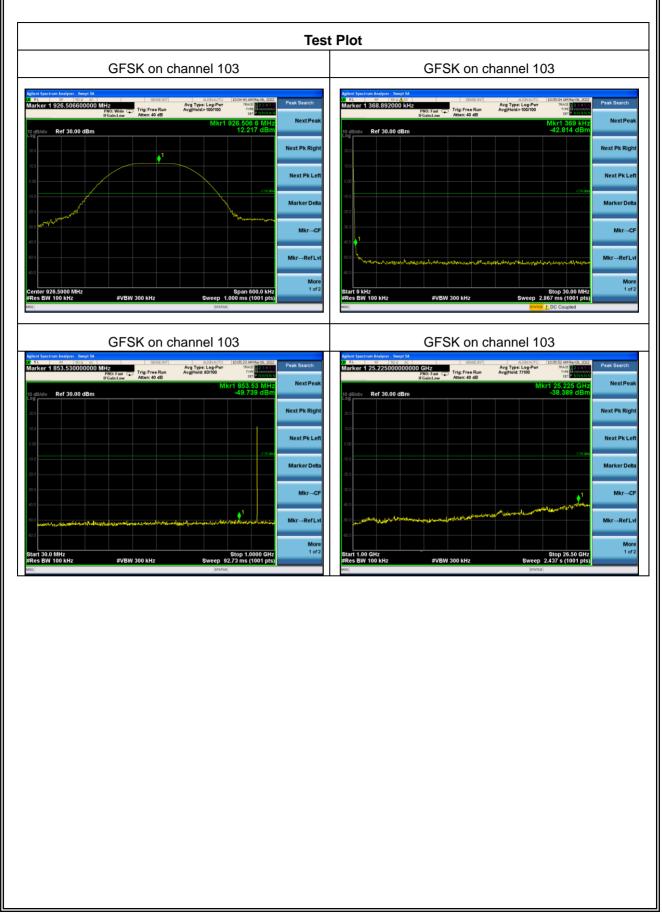






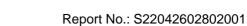
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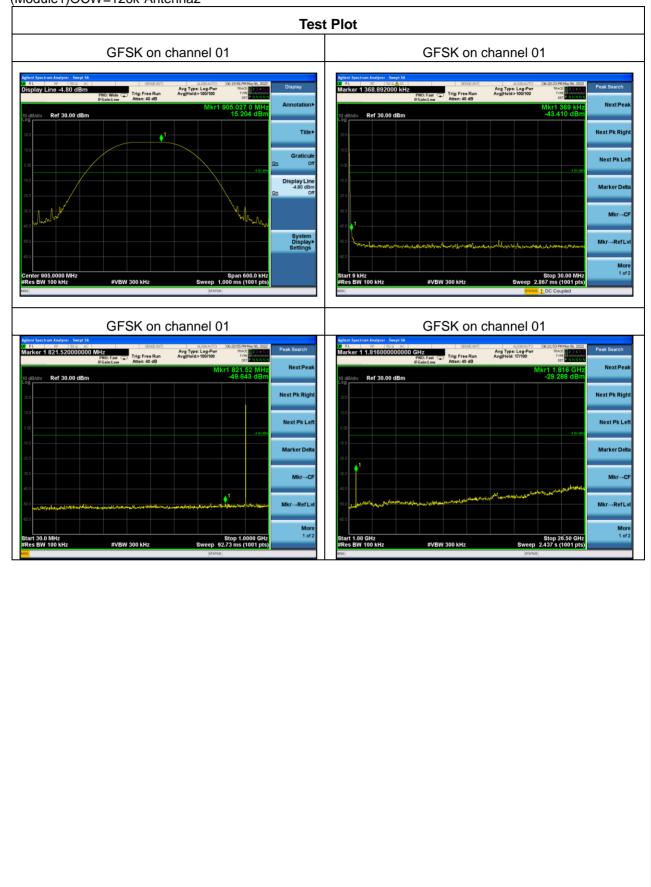




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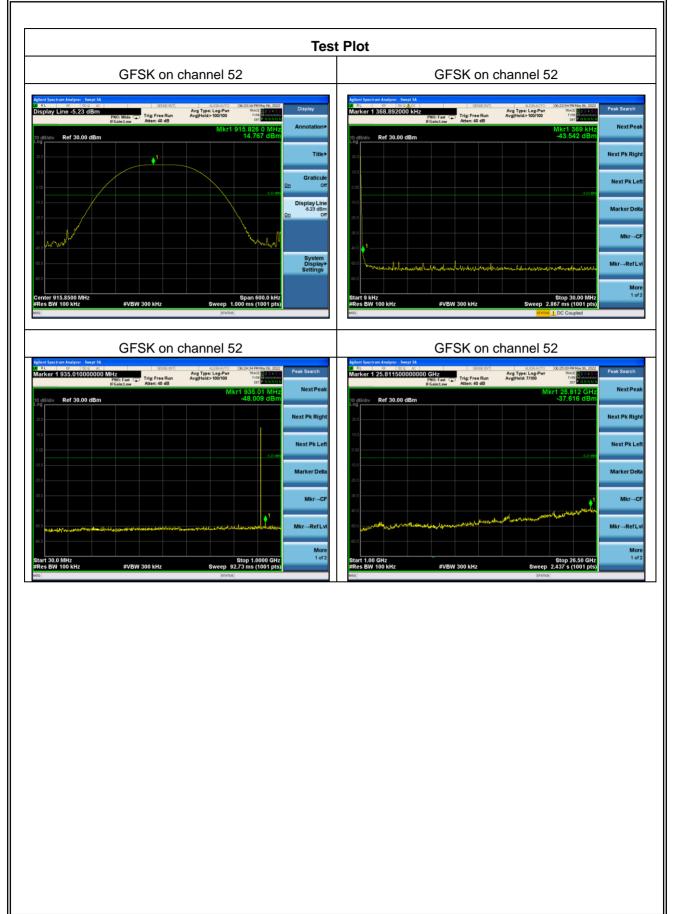


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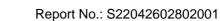


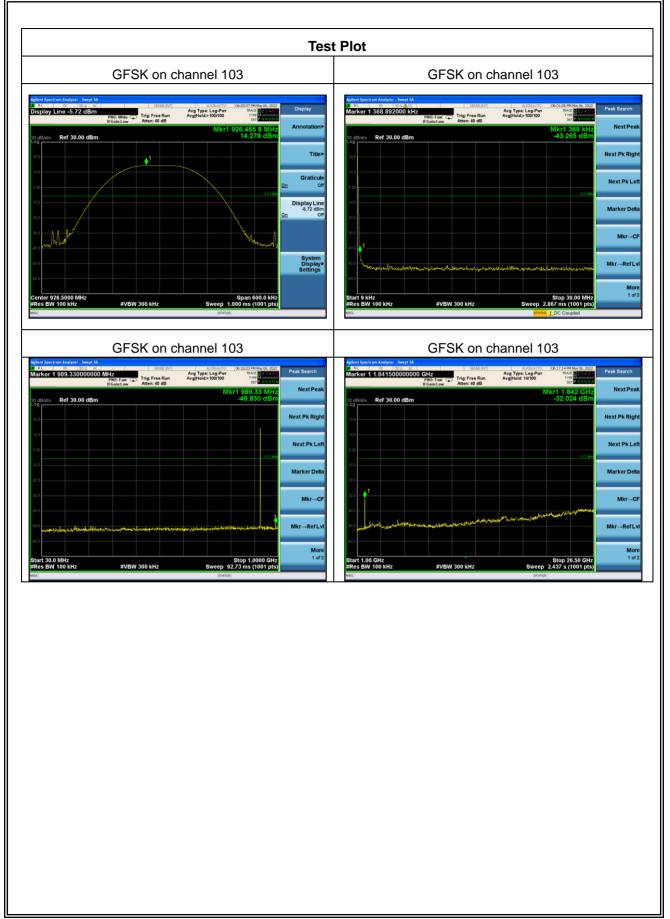






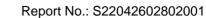
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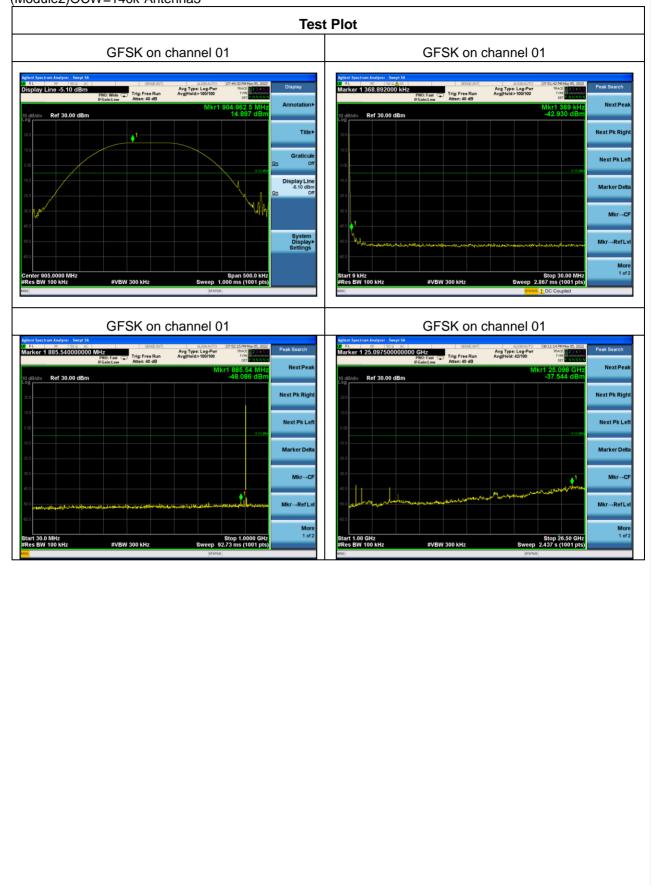




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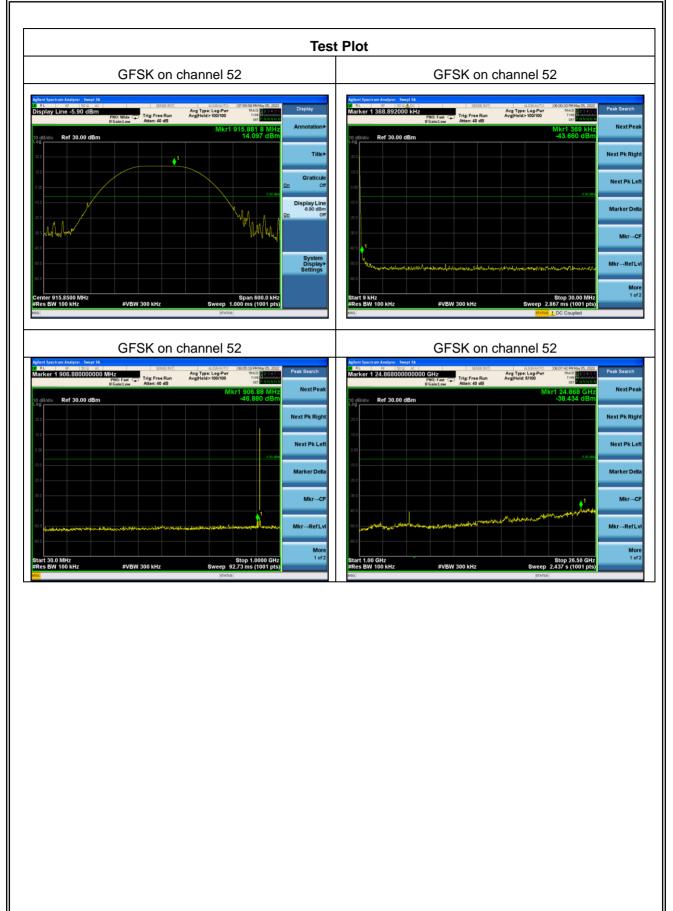


(Module2)OCW=140k-Antenna3



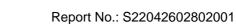


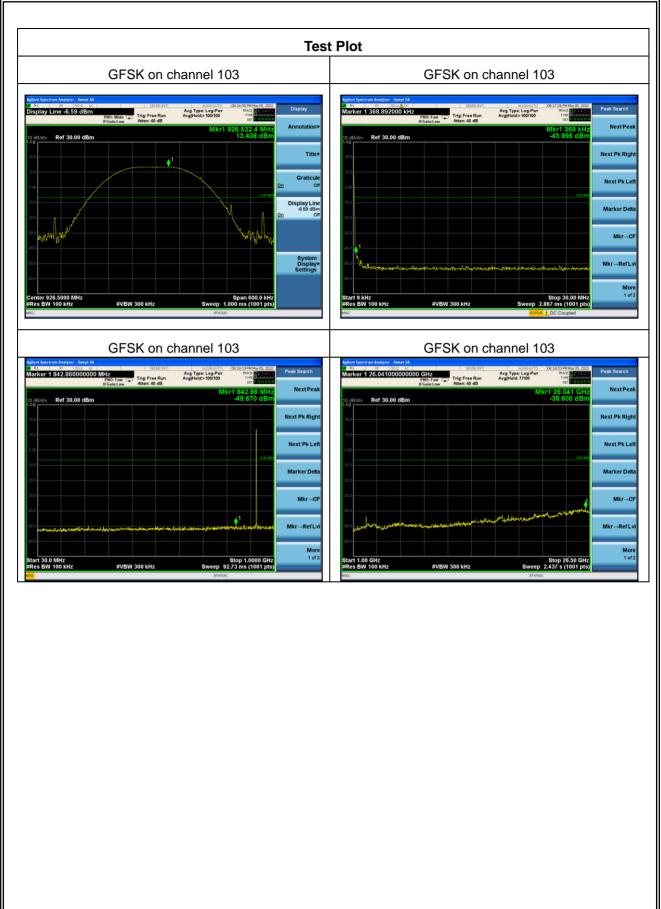






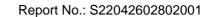
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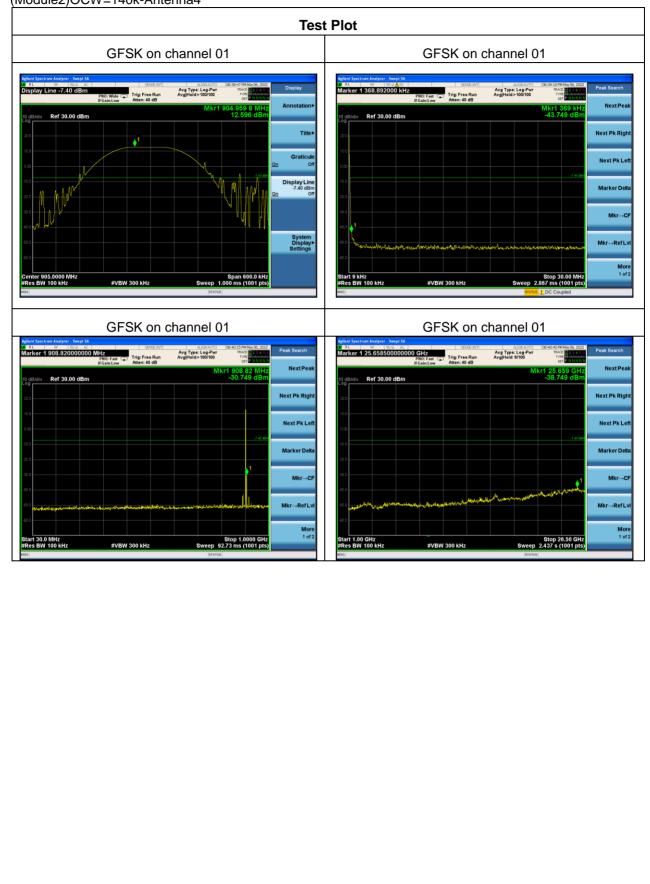




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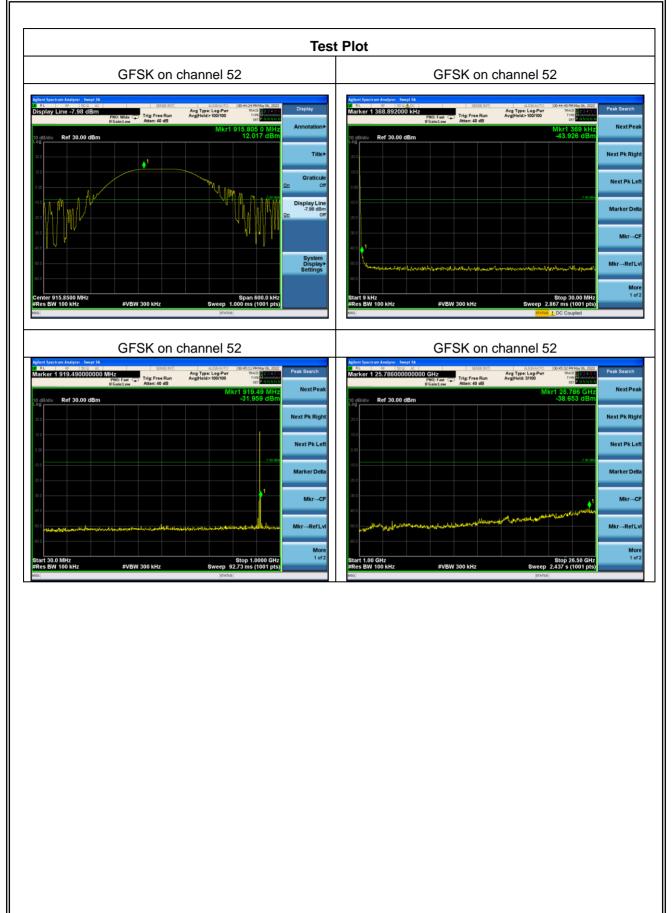


(Module2)OCW=140k-Antenna4



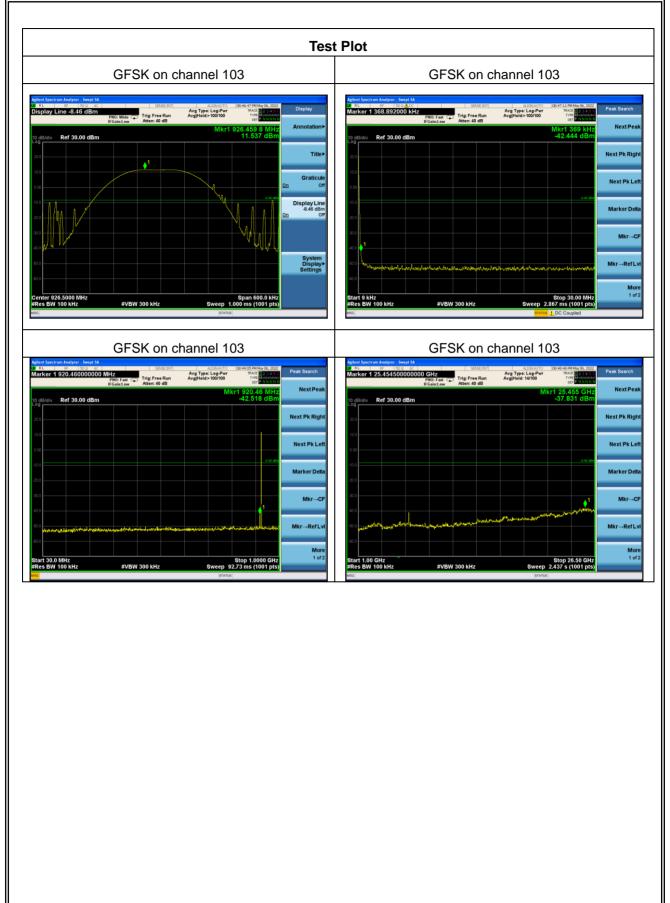
















## 7.10 ANTENNA APPLICATION

## 7.10.1 Antenna Requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible partyshall be used with the device.

## 7.10.2 Result

The EUT has four antenna connector and use only the Antenna1Type: Planar Inverted L- Antenna(Gain:-5dB). Antenna2Type: Planar Inverted F- Antenna (Gain:-6dBi). Antenna3Type: Planar Inverted F- Antenna (Gain: -6dBi). Antenna4Type: Planar Inverted F- Antenna (Gain: -6dBi). It comply with the standard of 15.203 requirement.

END OF REPORT