

**FCC 47 CFR PART 15 SUBPART C &  
INDUSTRY CANADA RSS-247 ISSUE 1 May 2015**

**CERTIFICATION TEST REPORT**

*For*

**Product name: WellIntel Radio**

**MODEL No.: RM0608**

**FCC ID: 2AEOD-1400004B00101**

**IC: 20139-1400004B001**



**Trade Mark: WellIntel**

**REPORT NO: ES150319200E2**

**ISSUE DATE: July 15, 2015**

*Prepared for*

**WellIntel, Inc.  
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Wisconsin, United States**

*Prepared by*

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## 1 TEST RESULT CERTIFICATION

Applicant:	WellIntel, Inc. 4230 N. Oakland Avenue #202, Shorewood, Wisconsin, United States
Manufacturer:	Peak Gain Wireless LLC N69W25055 Indiangrass Ln, Unit J, Sussex, WI, USA
Product Description:	Wireless Module
Model Number:	RM0608
File Number:	ES150319200E2
Date of Test:	March 19, 2015 to July 15, 2015

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C IC RSS-GEN, Issue 4, Nov 2014 IC RSS-247 Issue 1, May 2015.	PASS

The above equipment was tested by SHENZHEN EMTEK 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 the requirements of FCC Rules Part 2, Part 15.247, RSS-247 ISSUE 1, RSS-GEN ISSUE 4.

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

Date of Test :

March 19, 2015 to July 15, 2015

Test by :

KingKong /Tester

Prepared by :

Yaping Shen /Editor

Approve & Authorized Signer :

Lisa Wang/Manager

## 2 EUT TECHNICAL DESCRIPTION

EUT Description	BW (kHz)	Start frequency (MHz)	End frequency(MHz)	Spacing (kHz)	Number of Channels
Channel Bandwidth 1: 7.8KHz DSS	7.8125	902.018750	927.968750	25	1039
Channel Bandwidth 2: 10.4KHz DSS	10.4167	902.025000	927.950000	25	1038
Channel Bandwidth 3: 15.6KHz DSS	15.625	902.037500	927.962500	25	1038
Channel Bandwidth 4: 20.8KHz DSS	20.8333	902.050	927.950	25	1037
Channel Bandwidth 5: 31.25KHz DSS	31.25	902.075	927.875	50	517
Channel Bandwidth 6: 41.7KHz DSS	41.6667	902.100	927.850	50	516
Channel Bandwidth 7: 62.5KHz DSS	62.5	902.150	927.850	100	258
Channel Bandwidth 8: 125KHz DSS	125	902.300	927.700	200	128
Channel Bandwidth 9: 250KHz DSS	250	902.600	927.000	400	62
Channel Bandwidth 10: 500KHz DTS	500	903.200	926.400	800	30

<b>Transmit Power Max</b>	27.638 dBm for DSS for antenna A 5.75 dBm for DSS for antenna B 27.315 dBm for DTS for antenna A -0.214 dBm for DTS for antenna B
<b>Antenna Type</b>	Antenna A: Dipole antenna(The antenna is connected via an reverse polarity SMA type connection) Antenna B: Matel antenna or Spiral antenna
<b>Antenna Gain</b>	2.5 dBi for Dipole antenna, 1.8 dBi for Matel antenna, 1.8 dBi for Spiral antenna
<b>Modulation</b>	FSK
<b>Power supply:</b>	DC 1.8V-3.7V
<b>Temperature Range</b>	-20°C ~ +55°C
<b>Product HW/SW version</b>	HW: PGW-007 RevA SW: xxx kHz(FCC test rev3). srec
<b>Radio HW/SW version</b>	HW: PGW-007 RevA SW: xxx kHz(FCC test rev3). srec
<b>Test SW Version</b>	STM32 ST-LINK Utility
<b>RF power setting in TEST SW</b>	28 dBm for antenna A& 6 dBm for antenna B

**Note:** All working modes (channel BW 1~9) and all antenna has been tested,The report show the worst test results.

### 3 SUMMARY OF TEST RESULT

FCC Part Clause	IC Part Clause	Test Parameter	Verdict	Remark
15.247(a)(1)	RSS-247.5.1(2)	20 dB Bandwidth	PASS	
15.247(a)(1)	RSS-247.5.1(4)	Carrier Frequency Separation	PASS	
15.247(a)(1)	RSS-247.5.1(4)	Number of Hopping Frequencies	PASS	
15.247(a)(1)	RSS-247.5.1(5)	Average Time of Occupancy (Dwell Time)	PASS	
15.247(b)(1)	RSS-247.5.4(4)	Maximum Peak Conducted Output Power	PASS	
15.247(c)	RSS-Gen 8.8	Conducted Spurious Emissions	PASS	
15.247(d) 15.209	RSS-Gen.6.13	Radiated Spurious Emissions	PASS	
15.207	RSS-Gen 8.8	Conducted Emission	N/A	
15.247(b)	RSS-Gen.6.7	Antenna Application	PASS	
		NOTE1: N/A (Not Applicable)		

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

This submittal(s) (test report) is intended for FCC ID: 2AEOD-1400004B00101 and IC: 20139-1400004B001 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules, RSS-247 ISSUE 1, RSS-GEN ISSUE 4.

## 4 TEST METHODOLOGY

### 4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:  
 FCC 47 CFR Part 2, Subpart J  
 FCC 47 CFR Part 15, Subpart C  
 DA 00-705

### 4.2 MEASUREMENT EQUIPMENT USED

#### 4.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	Due CAL.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/16/2015	05/15/2016
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/16/2015	05/15/2016
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	05/15/2016
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/16/2015	05/15/2016
Voltage Probe	Rohde & Schwarz	TK9416	N/A	05/16/2015	05/15/2016
I.S.N	Rohde & Schwarz	ENY22	1109.9508.02	05/16/2015	05/15/2016

#### 4.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	Due CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2015	05/15/2016
Pre-Amplifier	HP	8447D	2944A07999	05/16/2015	05/15/2016
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2015	05/15/2016
Loop Antenna	ARA	PLA-1030/B	1029	05/16/2015	05/15/2016
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2015	05/15/2016
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/16/2015	05/15/2016
Cable	Schwarzbeck	AK9513	ACRX1	05/16/2015	05/15/2016
Cable	Rosenberger	N/A	FP2RX2	05/16/2015	05/15/2016
Cable	Schwarzbeck	AK9513	CRPX1	05/16/2015	05/15/2016
Cable	Schwarzbeck	AK9513	CRRX2	05/16/2015	05/15/2016

#### 4.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	Due CAL.
Spectrum Analyzer	Agilent	E4407B	88156318	05/16/2015	05/15/2016
Power meter	Anritsu	ML2495A	0824006	05/16/2015	05/15/2016
Power sensor	Anritsu	MA2411B	0738172	05/16/2015	05/15/2016
Signal Analyzer	Agilent	N9010A	My53470879	05/16/2015	05/15/2016

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### **4.3 DESCRIPTION OF TEST MODES**

The EUT has been tested under its typical operating condition.

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

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

## 5 FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

### 5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29  
The certificate is valid until 2016.10.28  
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)  
The Certificate Registration Number is L2291

: Accredited by TUV Rheinland Shenzhen, 2010.5.25  
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

: Accredited by FCC, July 24, 2013  
The Certificate Registration Number is 406365.

: Accredited by FCC, April 17, 2013  
The Certificate Registration Number is 709623.

: Accredited by Industry Canada, November 29, 2012  
The Certificate Registration Number is 4480A-2

## 6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

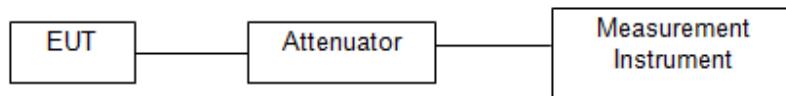
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0 \text{dB}$
Conducted Emissions Test	$\pm 2.0 \text{dB}$
Radiated Emission Test	$\pm 2.0 \text{dB}$
Occupied Bandwidth Test	$\pm 1.0 \text{dB}$
Band Edge Test	$\pm 3 \text{dB}$
All emission, radiated	$\pm 3 \text{dB}$
Antenna Port Emission	$\pm 3 \text{dB}$
Temperature	$\pm 0.5$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

## 7 SETUP OF EQUIPMENT UNDER TEST

### 7.1 RADIO FREQUENCY TEST SETUP 1

The module component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



### 7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz :

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

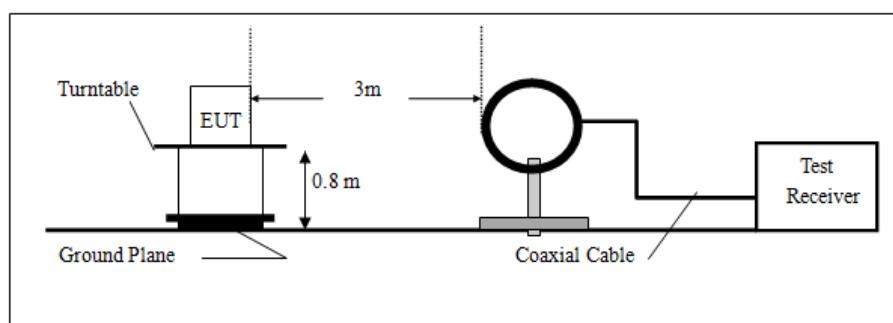
30GHz-1GHz :

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

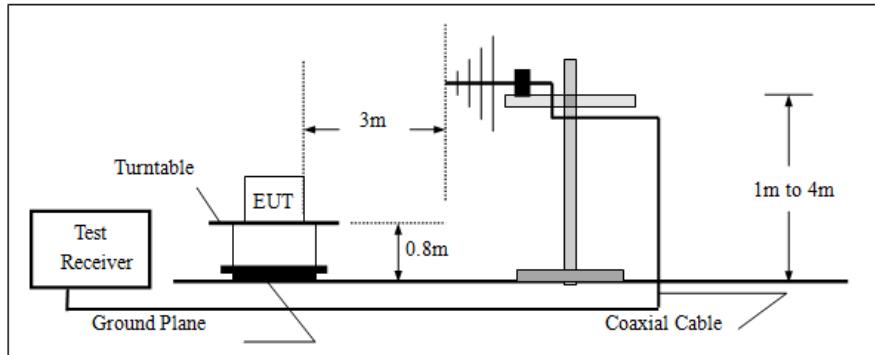
Above 1GHz :

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

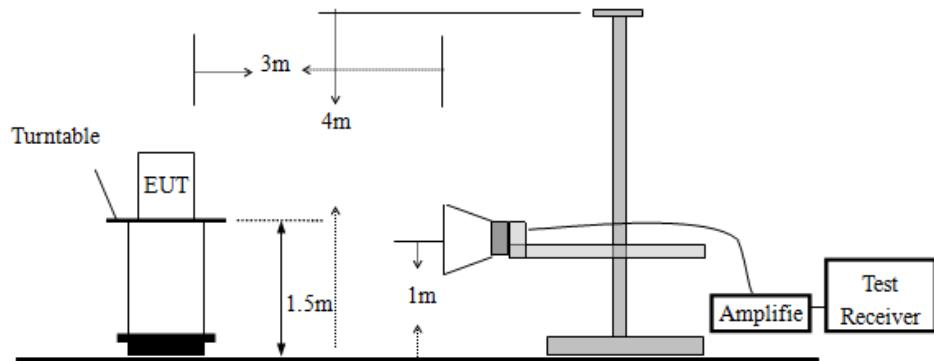
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

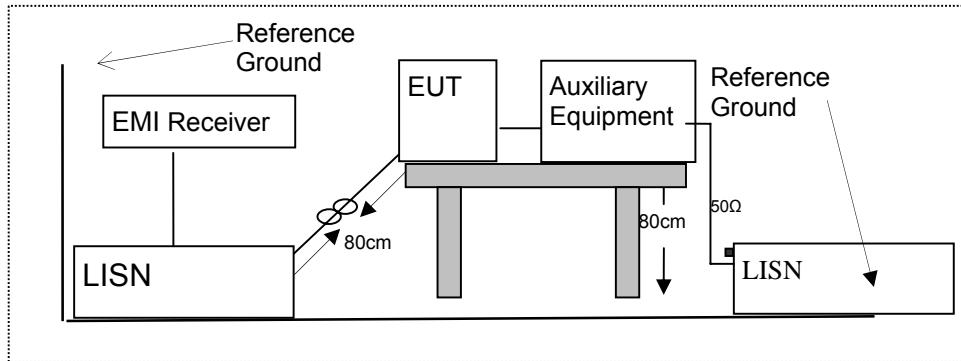


### 7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (Solar Speaker Lantern) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



#### 7.4 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Note
1.	Adapter	DYS	DYS122050200W-1	N/A

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 8 FREQUENCY HOPPING SYSTEM REQUIREMENTS

### 8.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

### 8.2 EUT Pseudorandom Frequency Hopping Sequence

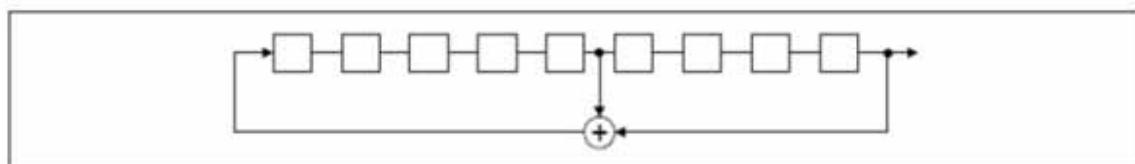
#### With Bandwidth 9 as an example:

The channel is represented by a pseudo-random hopping sequence hopping through the 62 RF channels. The hopping sequence is unique for the piconet and is determined by the device address of the master; the phase in the hopping sequence is determined by the clock of the master. The channel is divide into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The normal hop is 1 600 hops/s.

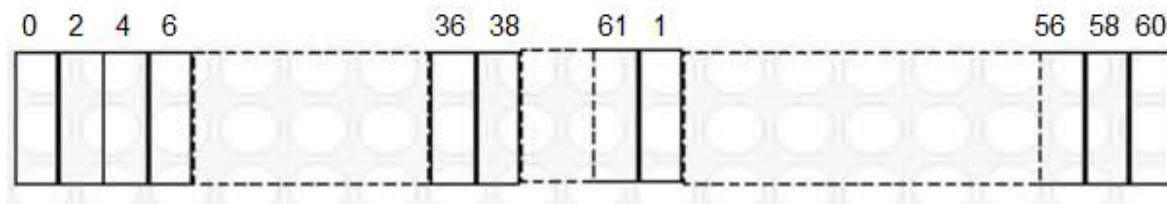
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage, and the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones. Number of shift register stages: 9

Length of pseudo-random sequence:  $2^9 - 1 = 512$  bits

Longest sequence of zeros: 8 (non-inverted signal)



*Linear Feedback Shift Register for Generation of the PRBS sequence*



Each frequency used equally on the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

### 8.3 Equal Hopping Frequency Use

**With Bandwidth 9 as an example:**

All units participating in the piconet are time and hop-synchronized to the channel.

Example of a 62 hopping sequence in data mode:

35, 27, 6, 44, 14, 61, 54, 32, 1, 11, 23, 2, 55, 60, 29, 3, 9, 52, 48, 58, 40, 25, 0, 7, 18, 26, 16, 60, 47, 50, 2, 5, 16, 37, 29, 44, 17, 54, 20, 13, 4, 8, 15, 21, 26, 10, 40, 51, 18, 14, 43, 24, 57, 39, 46, 43, 48, 33, 17, 31, 5, 19,

41, 16, 24, 28, 51, 3, 30, 56, 34, 59, 11, 22, 49, 34, 38, 45, 36, 42, 53

Each Frequency used equally on the average by each transmitter

### 8.4 Frequency Hopping System

This device uses radio which operates in 902-928 MHz band. The device uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it in the range 902-928 MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All unit participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the specification to provide an effective way for a radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the signal or the signal is interfering with another device. The AFH- enabled device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.

## 9 TEST REQUIREMENTS

### 9.1 20DB BANDWIDTH

#### 9.1.1 Applicable Standard

According to FCC Part 15.247(a)(1) and DA 00-705

#### 9.1.2 Conformance Limit

The maximum allowed 20dB bandwidth of hopping channel is 500kHz.

#### 9.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

#### 9.1.4 Test Procedure

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

Set RBW = 1% of the 20dB bandwidth.

Set the video bandwidth (VBW)  $\geq$  RBW.

Set Span= approximately 2 to 3 times the 20 dB bandwidth

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the markerdelta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

Measure and record the results in the test report.

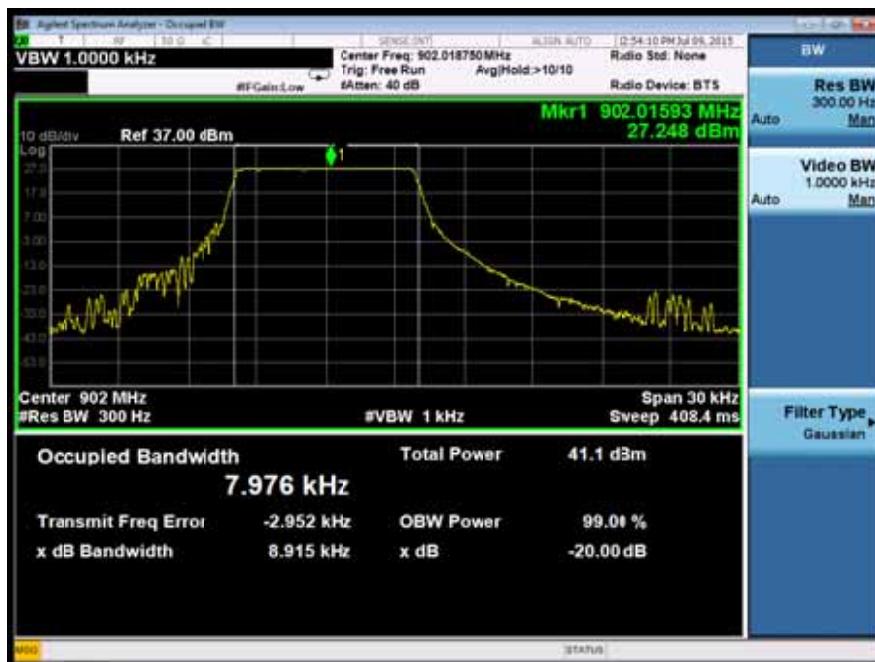
#### Test Results

Temperature :	26	Test Date :	April 27, 2015
Humidity :	60 %	Test By:	King Kong
Note:	<b>Bandwidth 1</b>		

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	8.915	<500	7.976	PASS
Mid	8.811	<500	7.956	PASS
High	9.090	<500	8.025	PASS

Test Model

DSS (20dB&99%) Bandwidth  
Low Channel



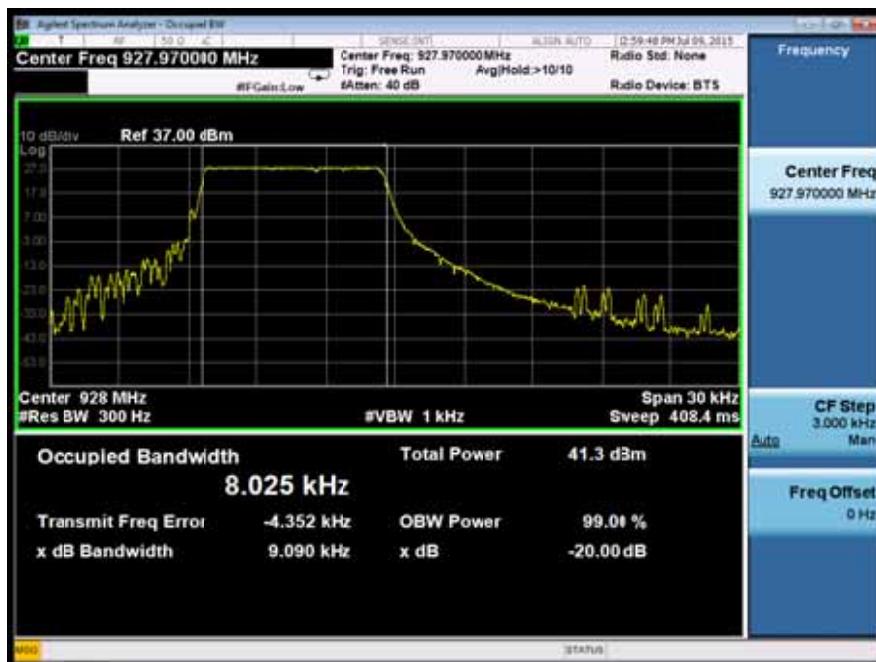
Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

DSS (20dB&99%) Bandwidth  
High Channel



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Note: **Bandwidth 2**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	11.74	<500	10.418	PASS
Mid	11.56	<500	10.446	PASS
High	11.49	<500	10.449	PASS

**DSS (20dB&99%) Bandwidth  
Low Channel**



Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

DSS (20dB&99%) Bandwidth  
High Channel



Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Note: **Bandwidth 3**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	17.01	<500	15.611	PASS
Mid	17.24	<500	15.641	PASS
High	16.57	<500	15.401	PASS

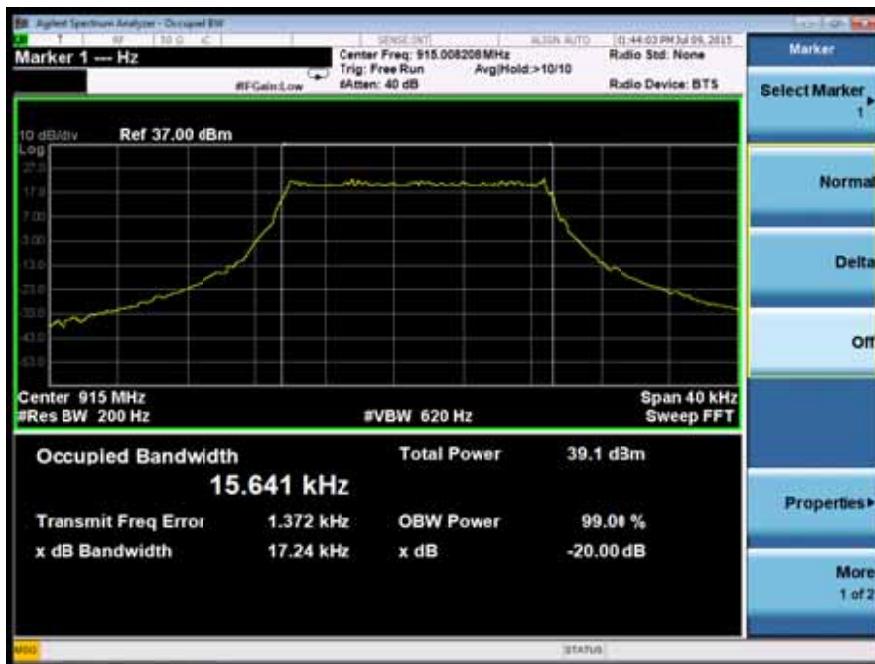
## Test Model

## DSS (20dB&99%) Bandwidth Low Channel



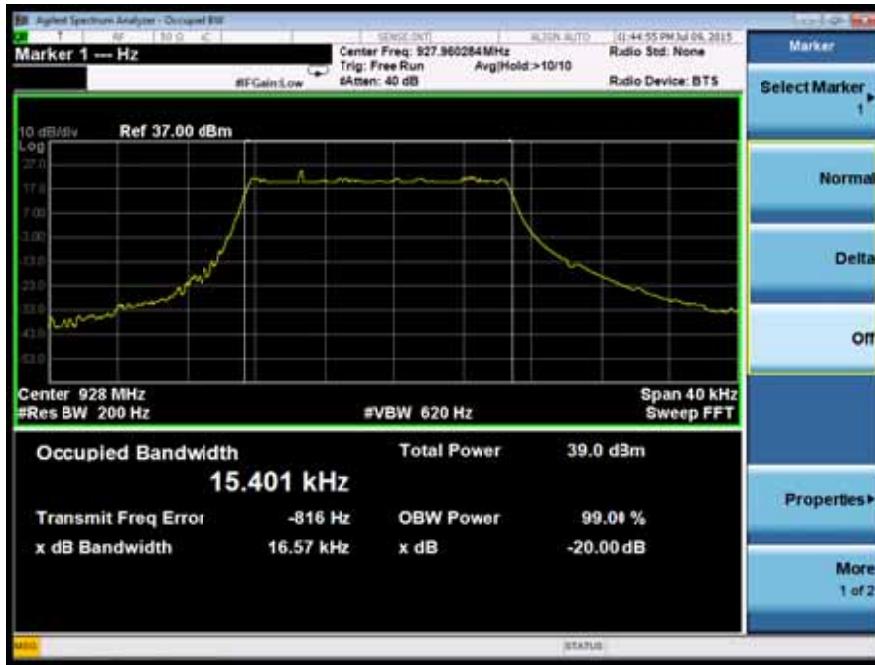
Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



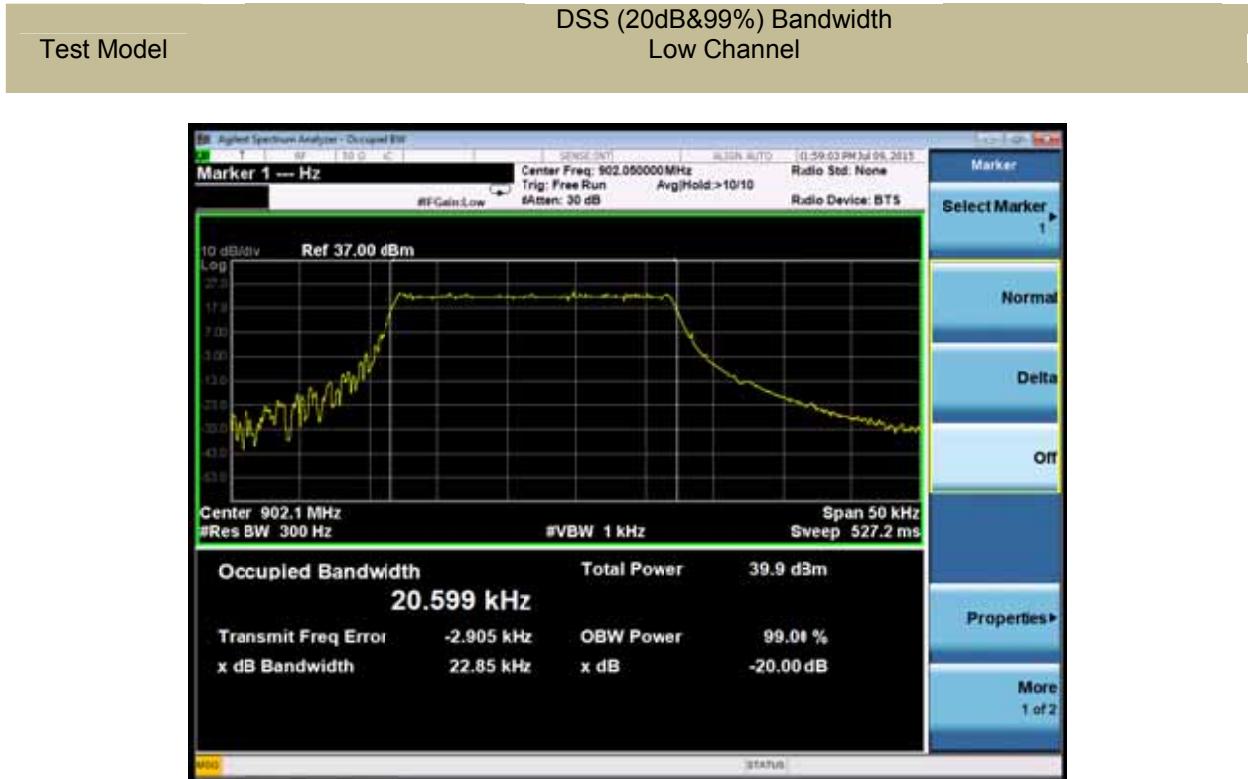
Test Model

DSS (20dB&99%) Bandwidth  
High Channel



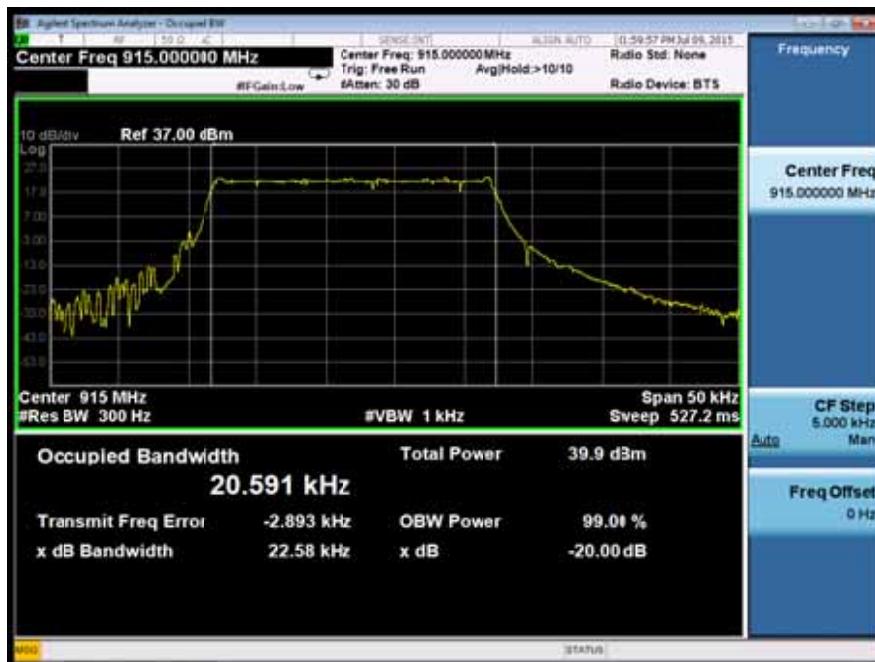
Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Note: **Bandwidth 4**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	22.85	<500	20.599	PASS
Mid	22.58	<500	20.591	PASS
High	22.54	<500	20.690	PASS



Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

DSS (20dB&99%) Bandwidth  
High Channel



Temperature :

26

Test Date :

April 27, 2015

Humidity :

60 %

Test By:

King Kong

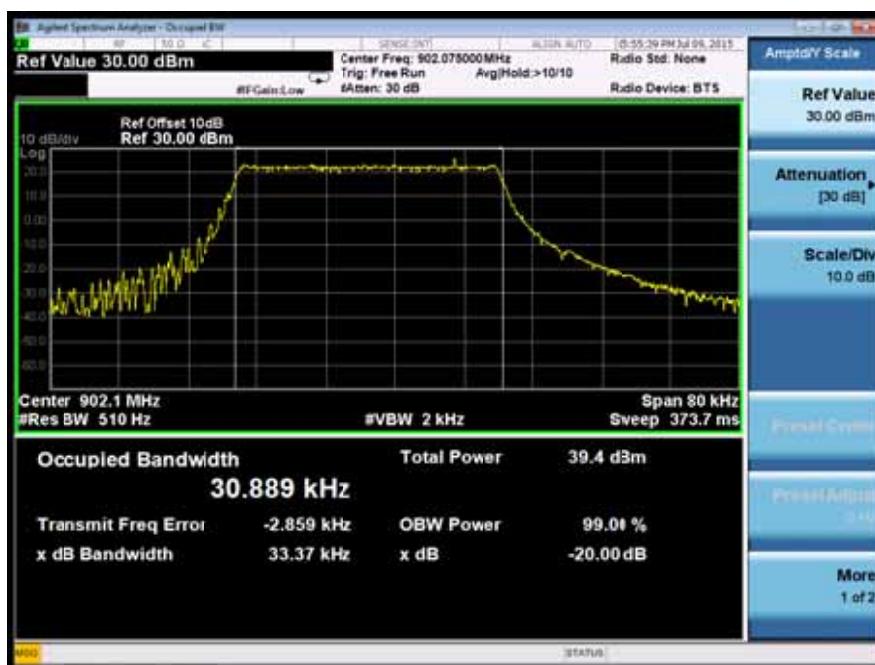
Note:

**Bandwidth 5**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	33.37	<500	30.889	PASS
Mid	33.99	<500	30.979	PASS
High	33.95	<500	30.922	PASS

Test Model

DSS (20dB&99%) Bandwidth  
Low Channel



Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

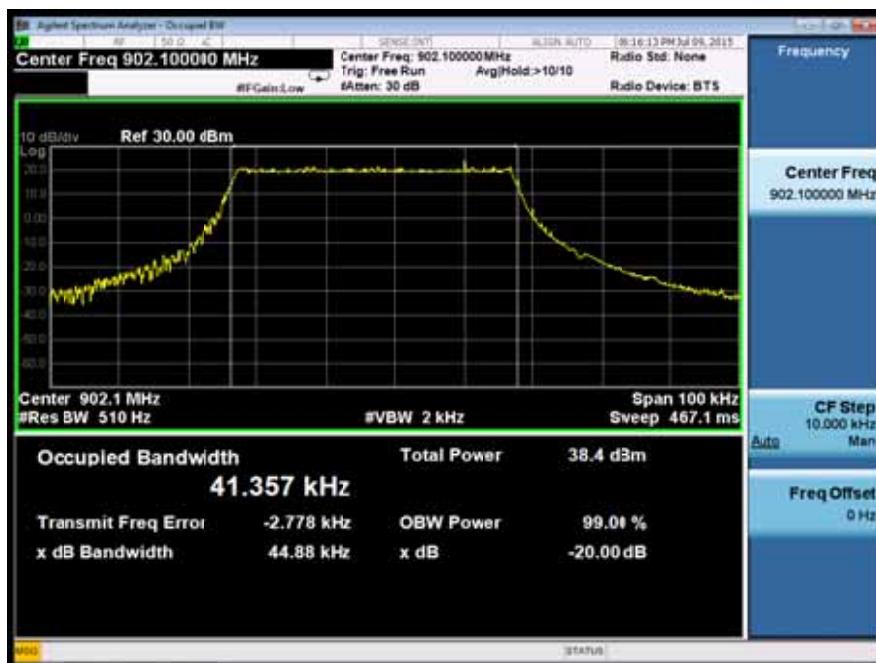
DSS (20dB&99%) Bandwidth  
High Channel



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Note: **Bandwidth 6**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	44.88	<500	41.357	PASS
Mid	44.67	<500	41.289	PASS
High	45.62	<500	41.123	PASS

DSS (20dB&99%) Bandwidth  
Low Channel



## Test Model

## DTS (20dB&99%) Bandwidth Mid Channel



## Test Model

## DSS (20dB&99%) Bandwidth High Channel



Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Note: **Bandwidth 7**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	67.14	<500	61.983	PASS
Mid	68.02	<500	62.075	PASS
High	66.91	<500	61.737	PASS

## Test Model

## DSS (20dB&99%) Bandwidth Low Channel



Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

DSS (20dB&99%) Bandwidth  
High Channel



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Note: **Bandwidth 8**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	138.3	<500	124.37	PASS
Mid	135.5	<500	123.85	PASS
High	135.9	<500	123.89	PASS

**DSS (20dB&99%) Bandwidth  
Low Channel**



## Test Model

## DTS (20dB&99%) Bandwidth Mid Channel



## Test Model

## DSS (20dB&99%) Bandwidth High Channel



Temperature :

26

Test Date :

April 27, 2015

Humidity :

60 %

Test By:

King Kong

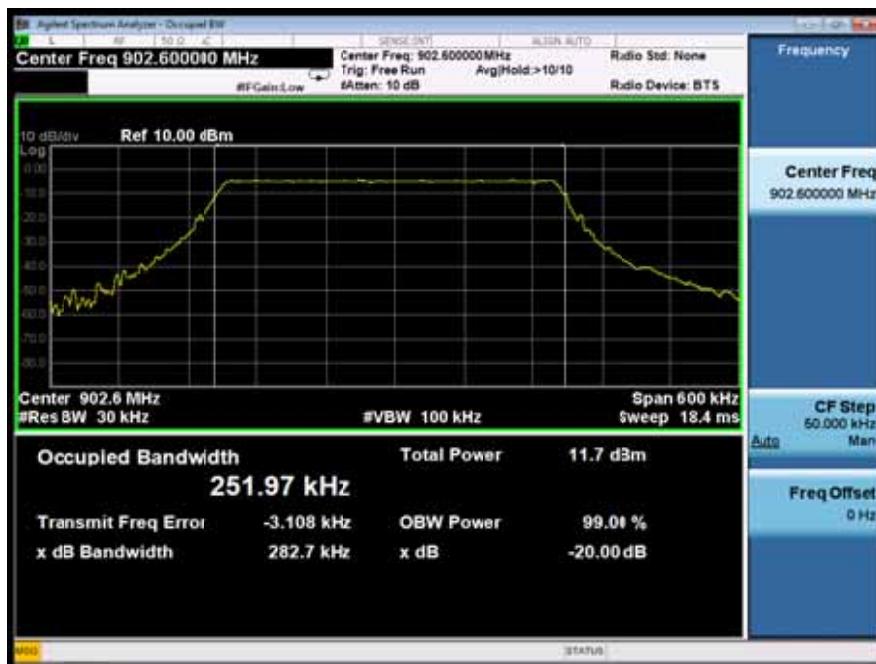
Note:

**Bandwidth 9**

Channel	20dB Bandwidth (KHz)	Limit(kHz)	99% Bandwidth (KHz)	Verdict
Low	282.7	<500	251.97	PASS
Mid	283.9	<500	251.73	PASS
High	279.0	<500	251.96	PASS

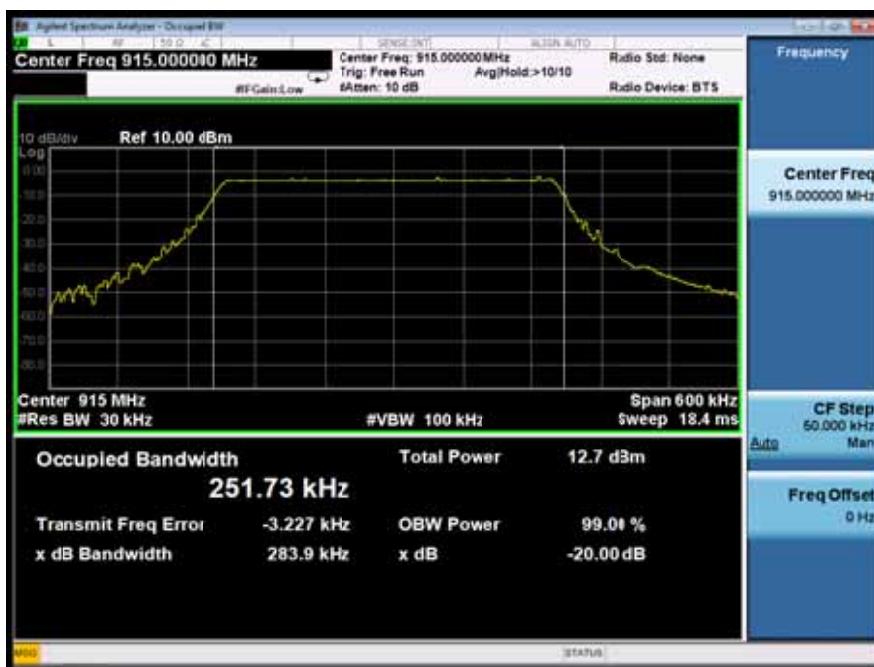
Test Model

DTS (20dB&99%) Bandwidth  
Low Channel



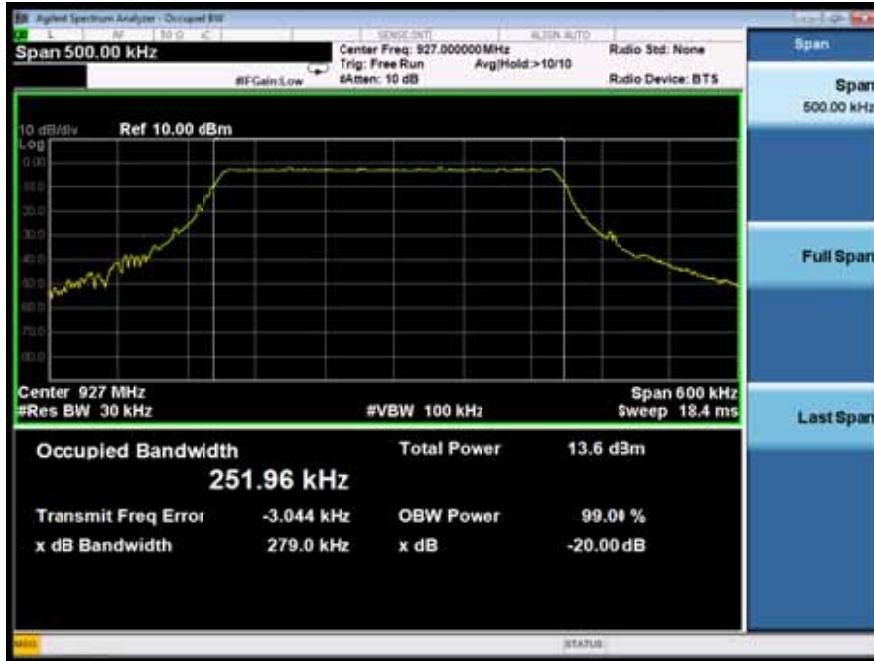
Test Model

DTS (20dB&99%) Bandwidth  
Mid Channel



Test Model

DTS (20dB&99%) Bandwidth  
High Channel



## 9.2 CARRIER FREQUENCY SEPARATION

### 9.2.1 Applicable Standard

According to FCC Part 15.247(a)(1) and DA 00-705

### 9.2.2 Conformance Limit

Frequency hopping systems operating in the 902-928MHz band shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

### 9.2.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 9.2.4 Test Procedure

- According to FCC Part15.247(a)(1)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Set the RBW =1% of span. Set VBW  $\geq$  RBW.

Set the span = wide enough to capture the peaks of two adjacent channels

Set Sweep time = auto couple.

Set Detector = peak. Set Trace mode = max hold.

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

### Test Results

Temperature:	24	Test Date:	April 30, 2015
Humidity:	53 %	Test By:	KK

Bandwidth 1:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	25	$\geq$ 25	PASS
	Mid	25	$\geq$ 25	PASS
	High	25	$\geq$ 25	PASS

Bandwidth 2:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	25	$\geq$ 25	PASS
	Mid	25	$\geq$ 25	PASS
	High	25	$\geq$ 25	PASS

Bandwidth 3:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	25	$\geq$ 25	PASS
	Mid	25	$\geq$ 25	PASS
	High	25	$\geq$ 25	PASS

## Bandwidth 4:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	25	≥25	PASS
	Mid	25	≥25	PASS
	High	25	≥25	PASS

## Bandwidth 4:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	25	≥25	PASS
	Mid	25	≥25	PASS
	High	25	≥25	PASS

## Bandwidth 5:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	50	≥33.37	PASS
	Mid	50	≥33.99	PASS
	High	50	≥33.95	PASS

## Bandwidth 6:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	50	≥44.88	PASS
	Mid	50	≥44.67	PASS
	High	50	≥45.62	PASS

## Bandwidth 7:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	100	≥67.14	PASS
	Mid	100	≥68.02	PASS
	High	100	≥66.91	PASS

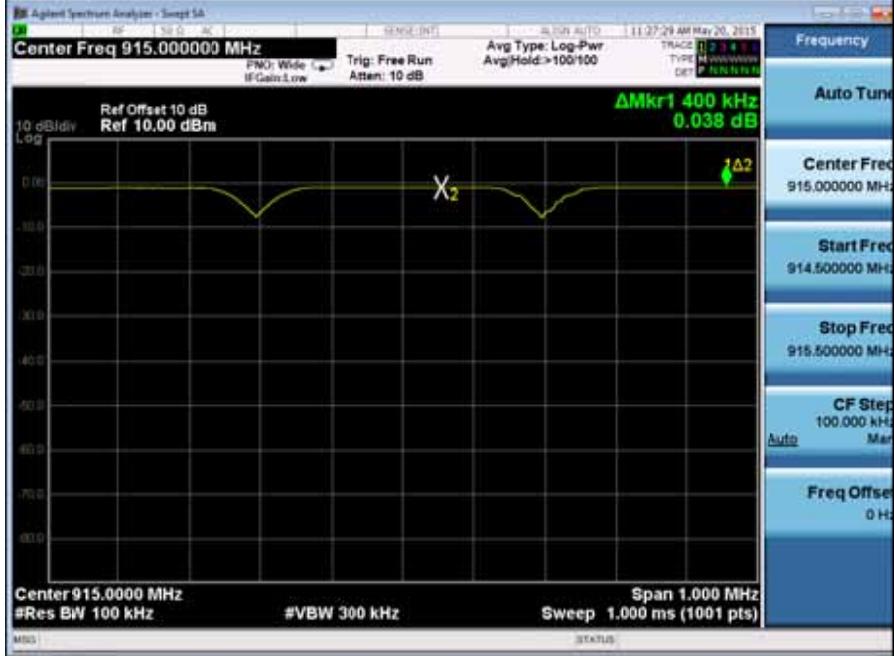
## Bandwidth 8:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	200	≥138.3	PASS
	Mid	200	≥135.5	PASS
	High	200	≥135.9	PASS

## Bandwidth 9:

Modulation Mode	Channel Number	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	Low	400	≥282.7	PASS
	Mid	400	≥283.9	PASS
	High	400	≥279.0	PASS

All working modes (channel BW 1~9) and all antenna has been tested, The follow page show the worst test results.

Test Model	Carrier Frequency Separation	
	Low Channel	
		
Test Model	Carrier Frequency Separation	
	Mid Channel	
		



### 9.3 NUMBER OF HOPPING FREQUENCIES

#### 9.3.1 Applicable Standard

According to FCC Part 15.247(a)(1) (i)and DA 00-705

#### 9.3.2 Conformance Limit

If the 20dB bandwidth of hopping channel is less than 250kHz, the system shall use at least 50 hopping frequencies, If the the 20dB bandwidth of hopping channel is 250kHz of greater, the system shall use at least 25 hopping frequencies

#### 9.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

#### 9.3.4 Test Procedure

- According to FCC Part15.247(a)(1)(i)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation (900-930MHz)

RBW 1% of the span, VBW RBW, Sweep = auto, Detector function = peak, Trace = max hold

Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

#### Test Results

Temperature:	24	Test Date:	April 30, 2015
Humidity:	53 %	Test By:	KK

Bandwidth	Quantity of Hopping Channel	Quantity of Hopping Channel limit
Bandwidth 1	1039	≥50
Bandwidth 2	1038	≥50
Bandwidth 3	1038	≥50
Bandwidth 4	1037	≥50
Bandwidth 5	517	≥50
Bandwidth 6	516	≥50
Bandwidth 7	258	≥50
Bandwidth 8	128	≥50
Bandwidth 9	62	≥25

All working modes (channel BW 1~9) and all antenna has been tested, The follow page show the worst test results.



## 9.4 AVERAGE TIME OF OCCUPANCY (DWELL TIME)

### 9.4.1 Applicable Standard

According to FCC Part 15.247(a)(1)(i) and DA 00-705

### 9.4.2 Conformance Limit

If the 20dB bandwidth of hopping channel is less than 250kHz, the system shall not be greater than 0.4s within a 20s, If the the 20dB bandwidth of hopping channel is 250kHz of greater, the system shall not be greater than 0.4s within a 10s

### 9.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 9.4.4 Test Procedure

■ According to FCC Part15.247(a)(1)(i)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1 MHz

VBW RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section.

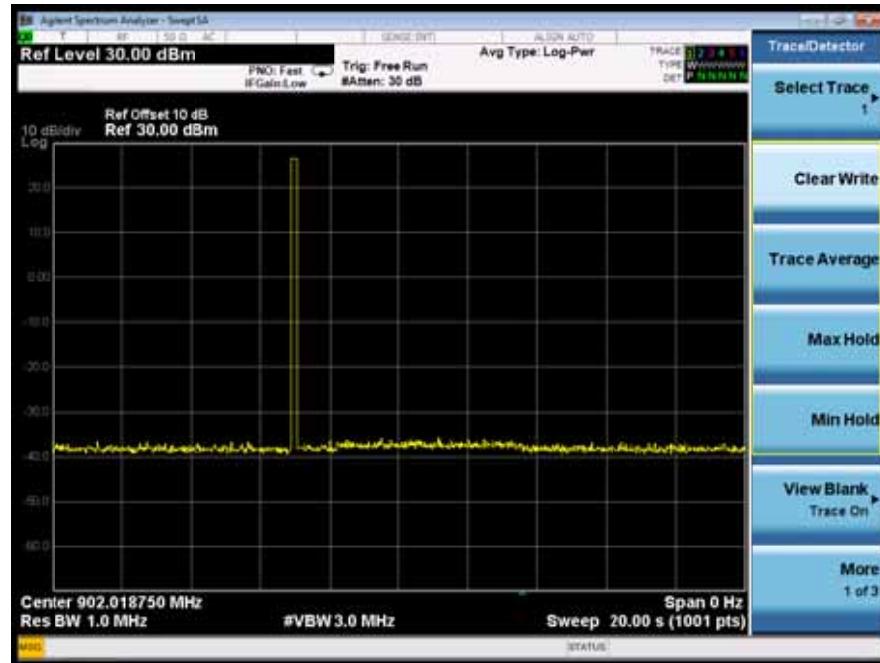
### 9.4.5 Test Results

Temperature:	24	Test Date:	April 30, 2015
Humidity:	53 %	Test By:	KK

#### Bandwidth 1:

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	160	<400	PASS
	Mid	160	<400	PASS
	High	160	<400	PASS

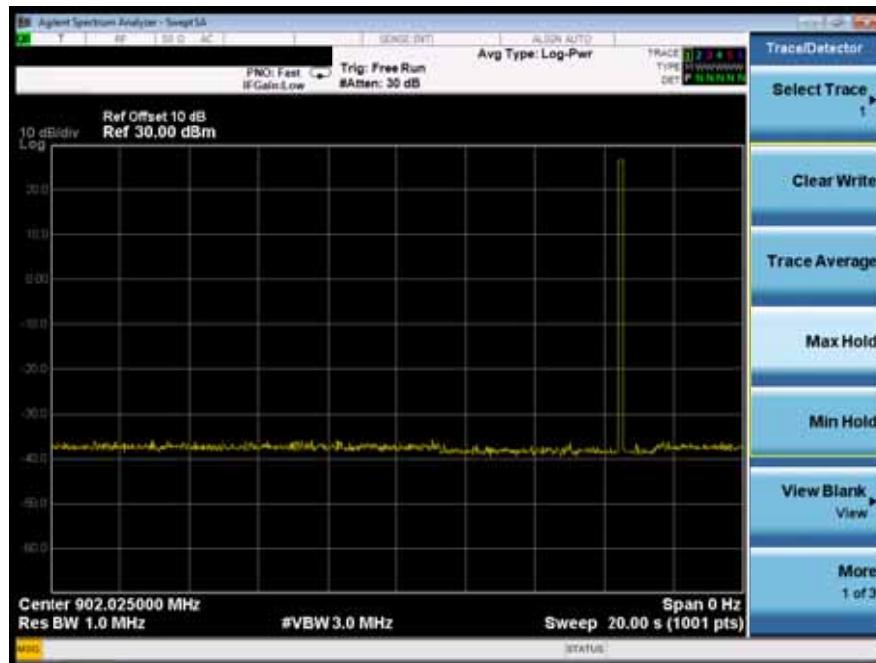
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 2:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	160	<400	PASS
	Mid	160	<400	PASS
	High	160	<400	PASS

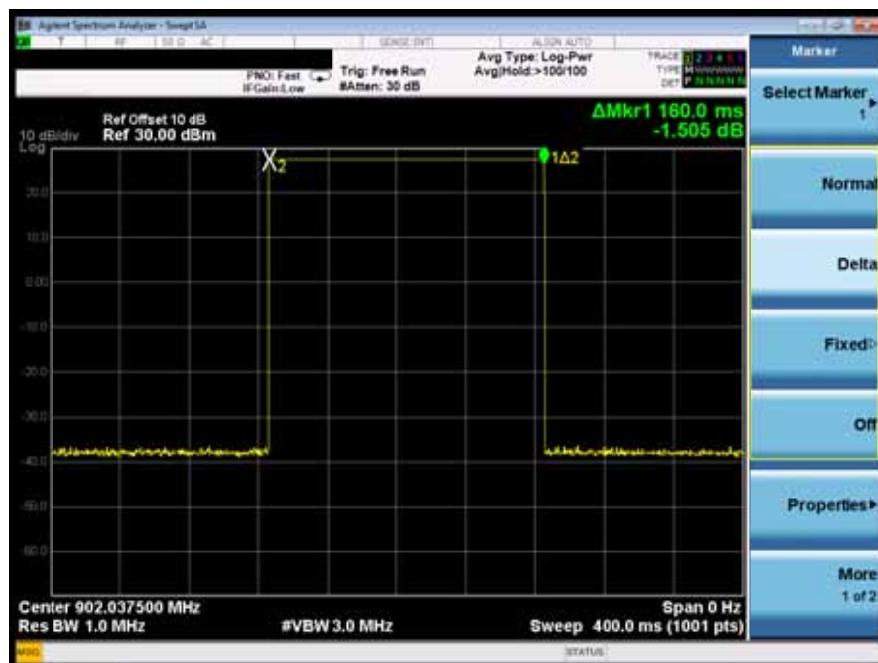
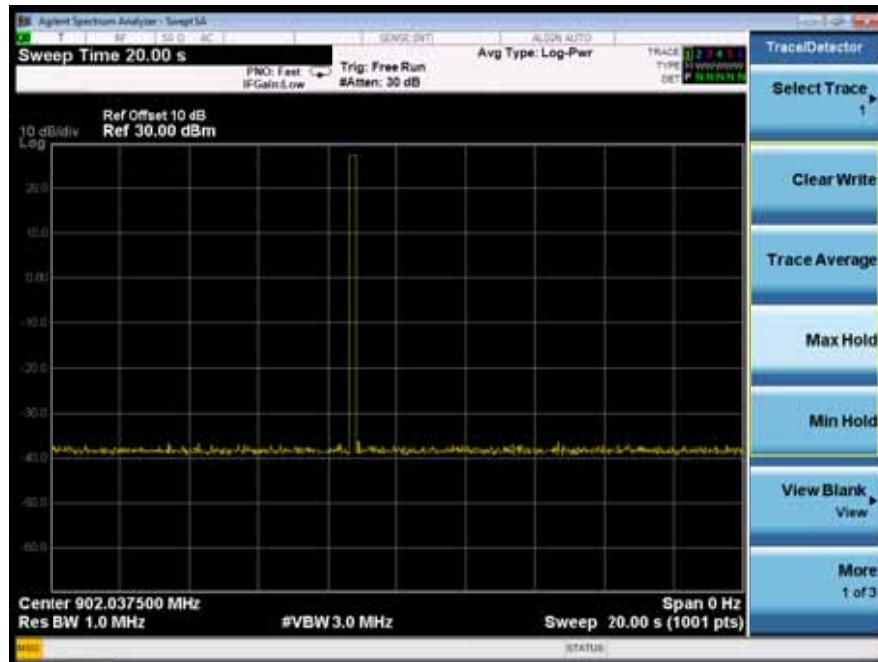
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 3:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	160	<400	PASS
	Mid	160	<400	PASS
	High	160	<400	PASS

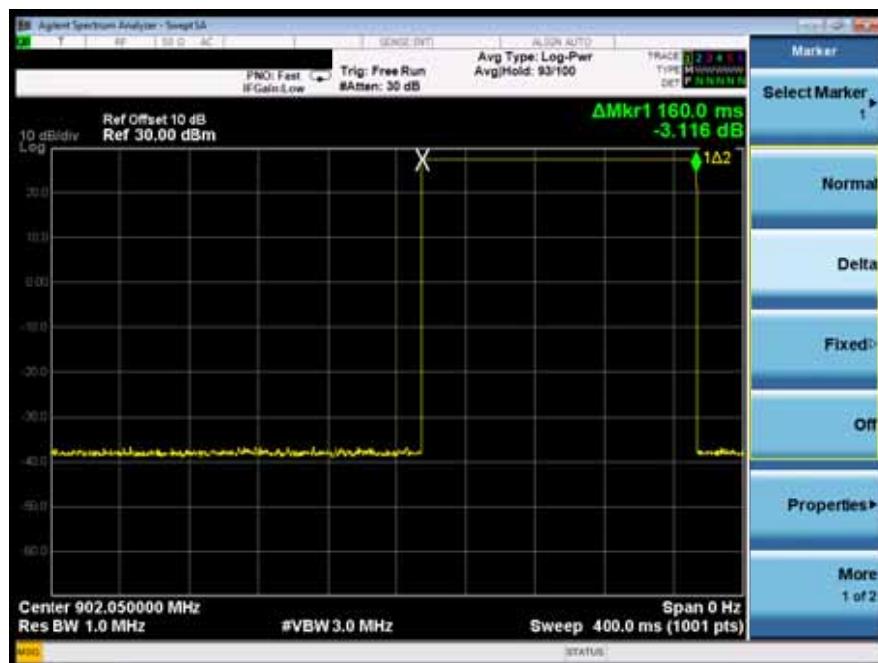
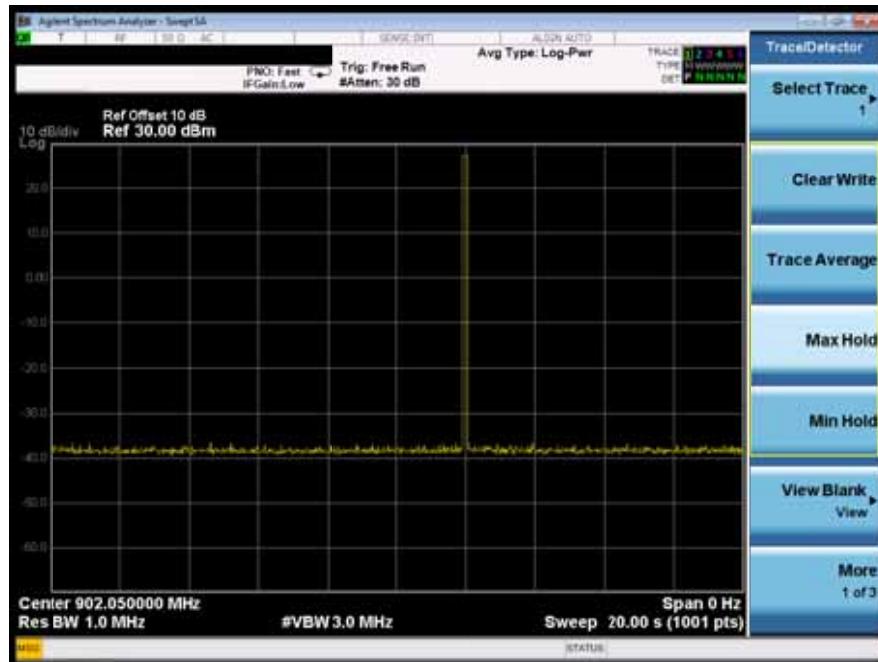
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 4:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	160	<400	PASS
	Mid	160	<400	PASS
	High	160	<400	PASS

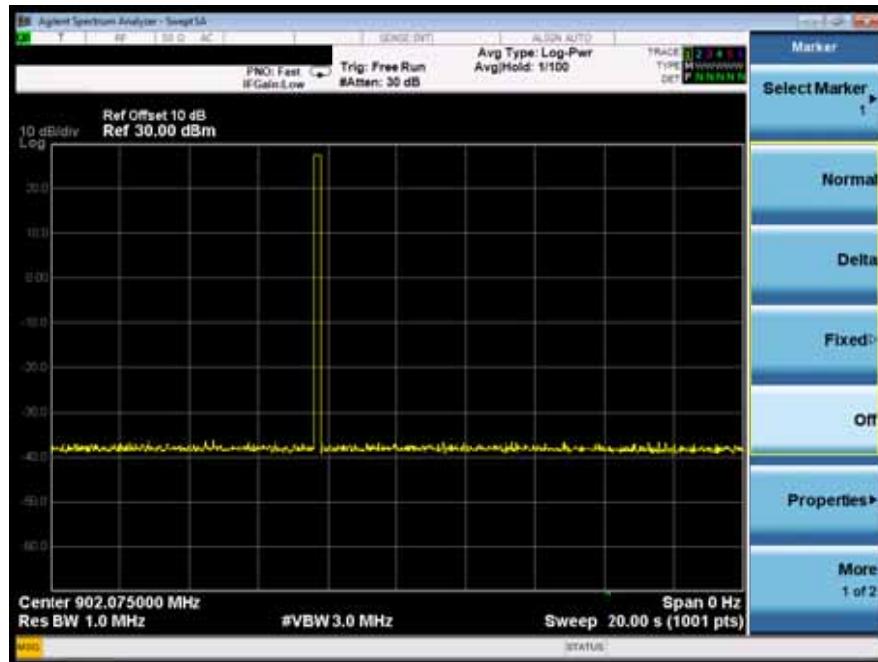
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth5:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	180	<400	PASS
	Mid	180	<400	PASS
	High	180	<400	PASS

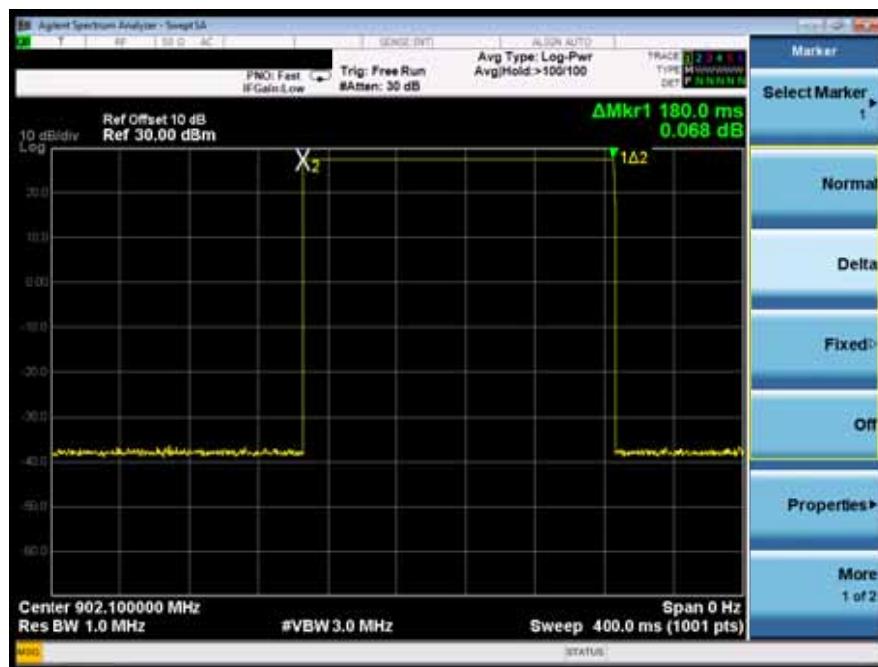
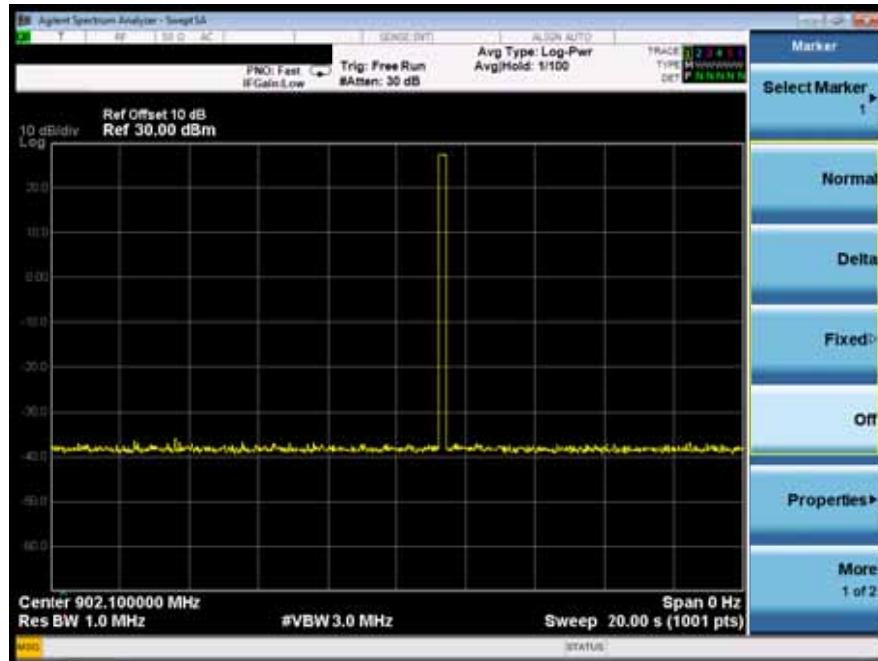
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 6:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	180	<400	PASS
	Mid	180	<400	PASS
	High	180	<400	PASS

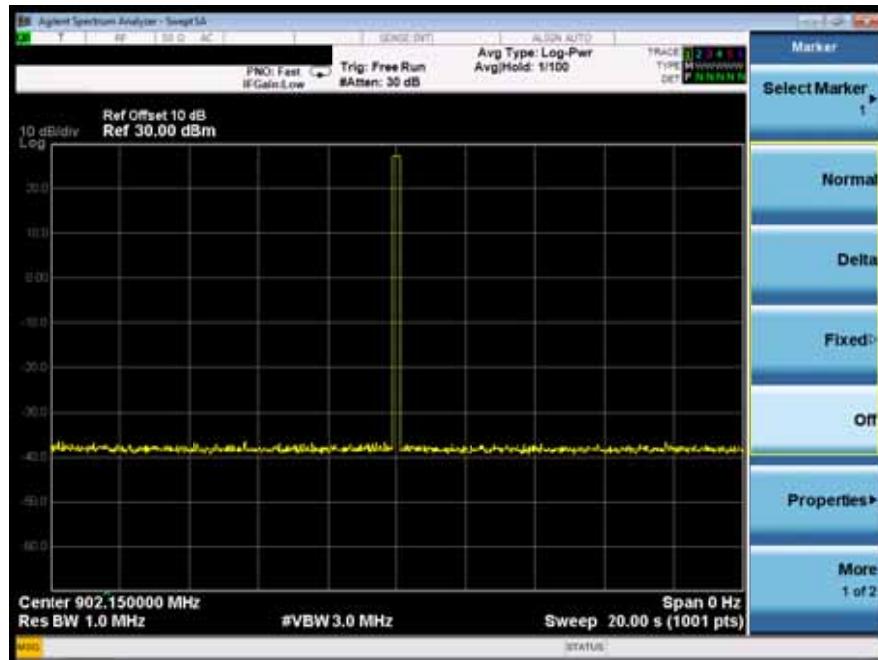
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 7:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	190	<400	PASS
	Mid	190	<400	PASS
	High	190	<400	PASS

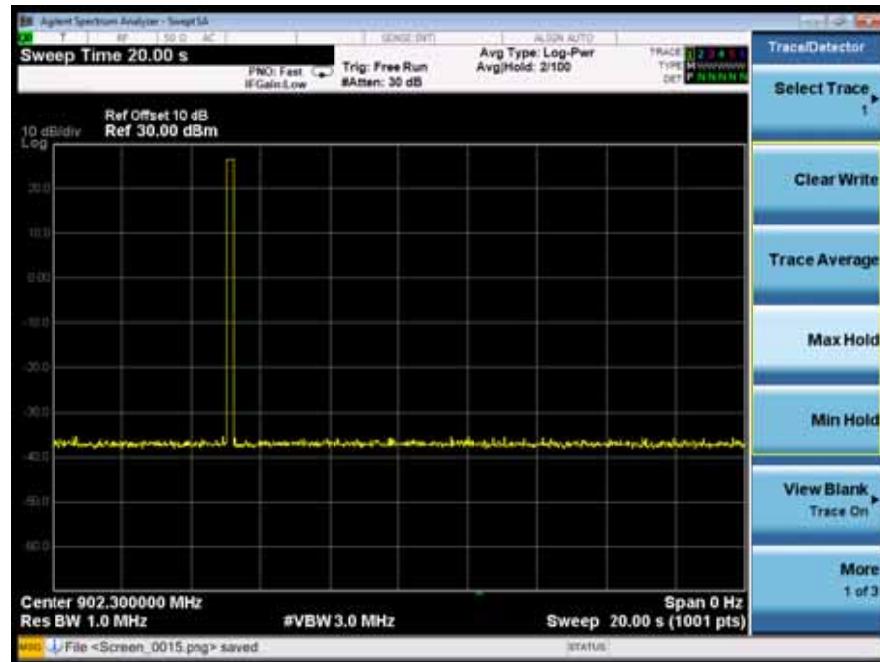
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 8:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 20s period (ms)	Verdict
GFSK	Low	190	<400	PASS
	Mid	190	<400	PASS
	High	190	<400	PASS

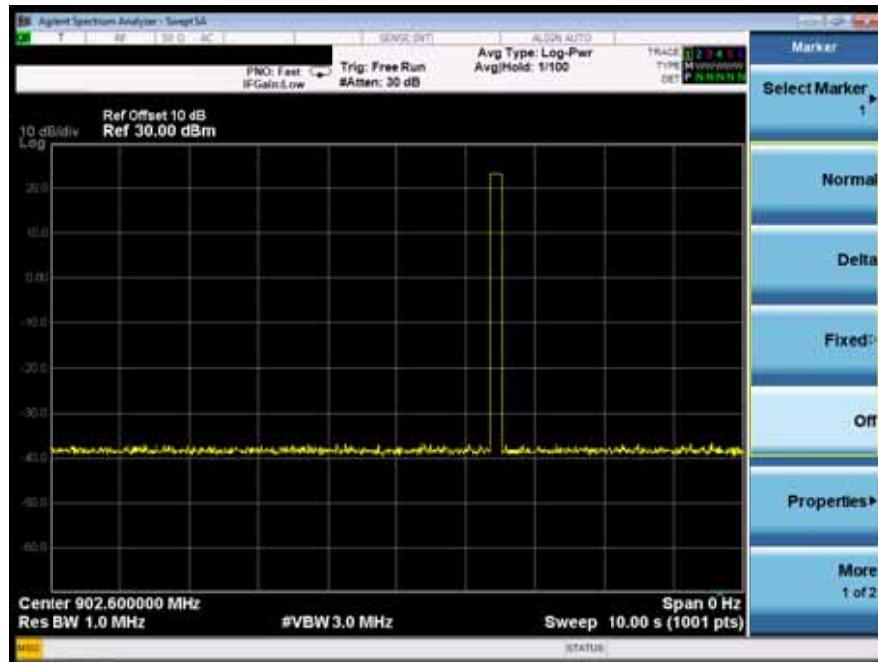
The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



**Bandwidth 9:**

Modulation Mode	Channel Number	Dwell Time (ms)	Limit in 10s period (ms)	Verdict
GFSK	Low	195	<400	PASS
	Mid	195	<400	PASS
	High	195	<400	PASS

The Low channel, Mid channel, High channel have been tested, The report show the Low channel results.



## 9.5 MAXIMUM PEAK CONDUCTED OUTPUT POWER

### 9.5.1 Applicable Standard

According to FCC Part 15.247(b)(1) and DA 00-705

### 9.5.2 Conformance Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 902-928 MHz bands shall not exceed: 1 Watt (30dBm).

### 9.5.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 9.5.4 Test Procedure

■ According to FCC Part15.247(b)(1)

As an alternative to a peak power measurement, compliance with the limit can be based on a measurement of the maximum conducted output power.

Use the following spectrum analyzer settings:

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel (about 10MHz)

Set RBW > the 20 dB bandwidth of the emission being measured (about 3MHz)

Set VBW  $\geq$  RBW

Set Sweep = auto

Set Detector function = peak

Set Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission to determine the peak amplitude level.

## Test Results

Temperature :	26	Test Date :	April 27, 2015
Humidity :	60 %	Test By:	King Kong
Antenna	A	<b>BandWidth 1</b>	

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.356	30	PASS
Mid	27.478	30	PASS
High	27.638	30	PASS

Test Model

Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A **BandWidth 2**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.318	30	PASS
Mid	27.439	30	PASS
High	27.566	30	PASS

## Test Model

Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 3**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.546	30	PASS
Mid	27.317	30	PASS
High	27.566	30	PASS

Test Model Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 4**

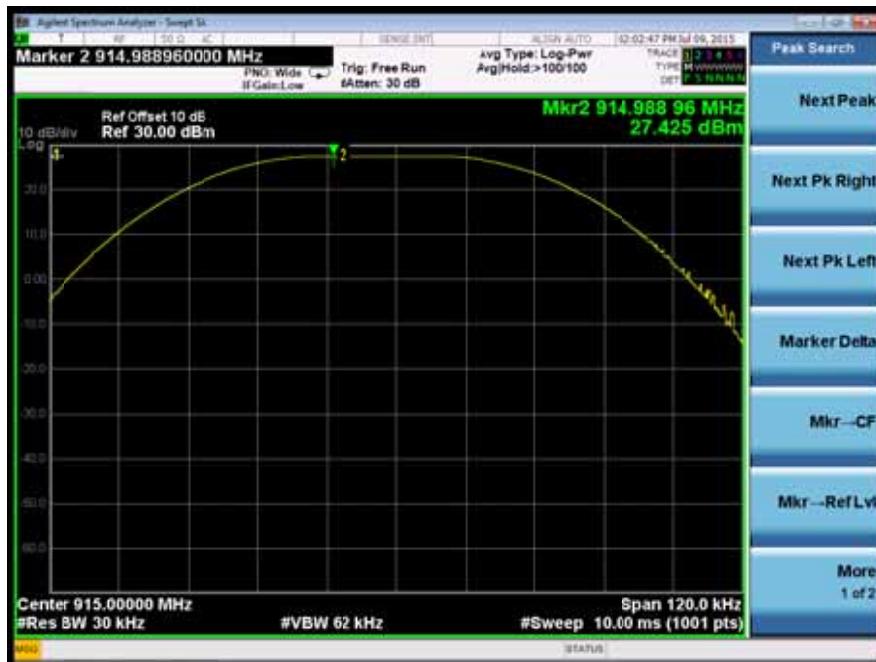
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.285	30	PASS
Mid	27.425	30	PASS
High	27.546	30	PASS

Test Model Conducted Power  
 Low Channel  
 Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 5**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.330	30	PASS
Mid	27.440	30	PASS
High	27.588	30	PASS

Test Model Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 6**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.337	30	PASS
Mid	27.468	30	PASS
High	27.601	30	PASS

Test Model Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 7**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.313	30	PASS
Mid	27.437	30	PASS
High	27.583	30	PASS

Test Model Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 8**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.326	30	PASS
Mid	27.499	30	PASS
High	27.587	30	PASS

Test Model Conducted Power  
Low Channel  
Antenna A



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna A

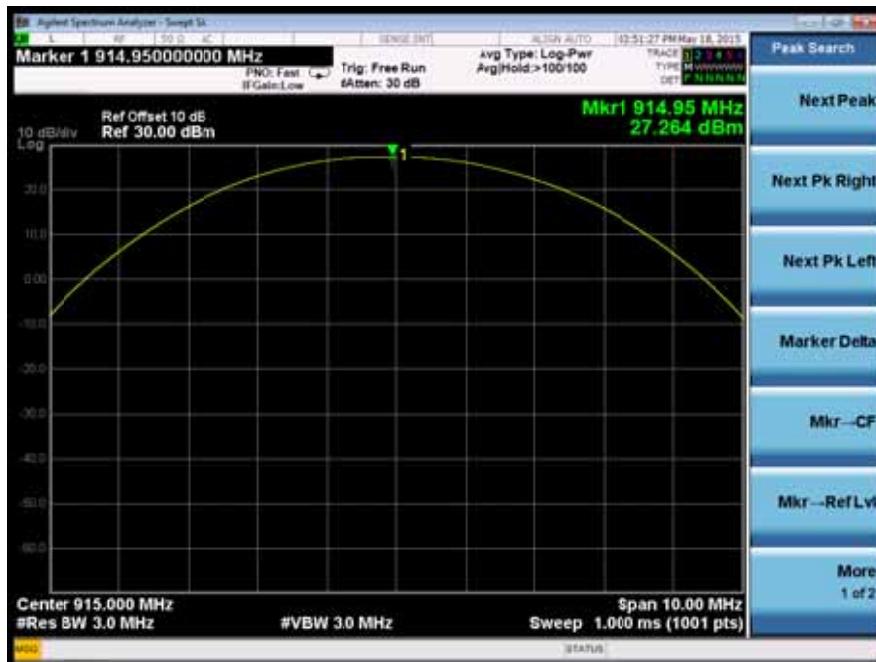
Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 9**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	27.195	30	PASS
Mid	27.364	30	PASS
High	27.358	30	PASS



Test Model

Conducted Power  
Mid Channel  
Antenna A



Test Model

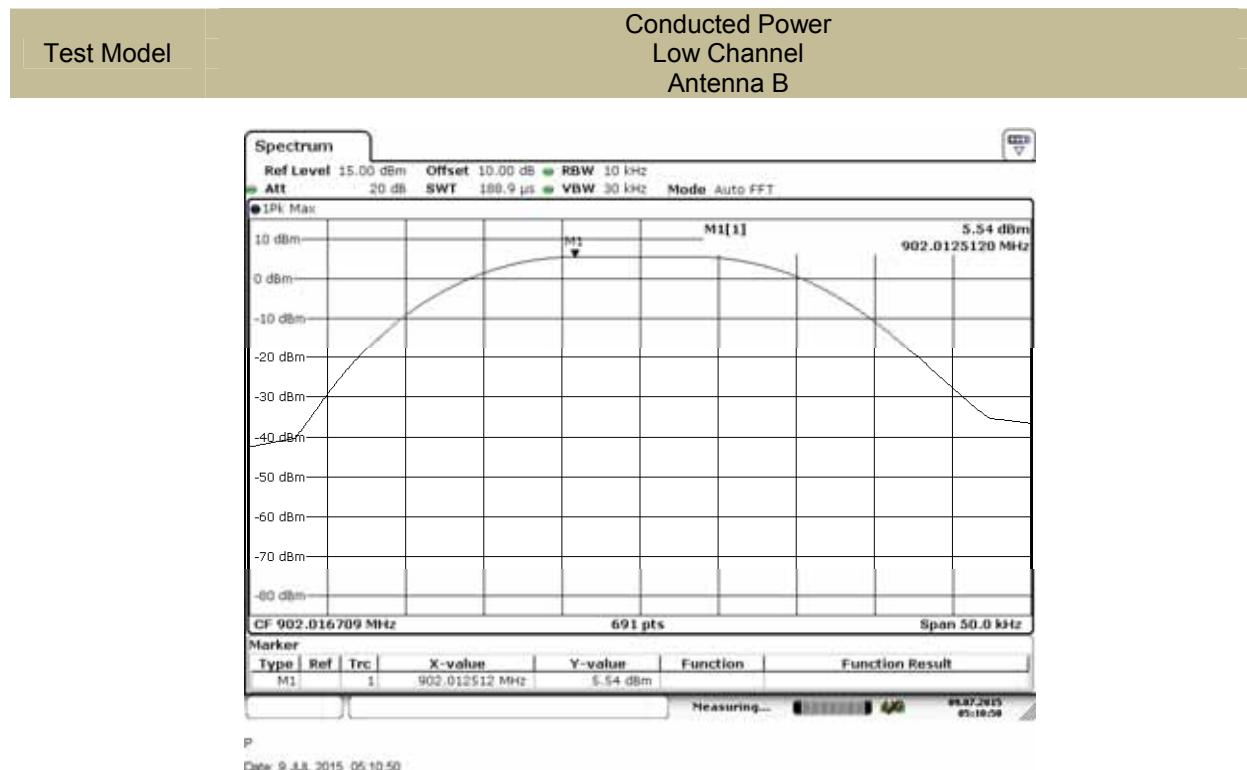
Conducted Power  
High Channel  
Antenna A



Temperature : 26  
Humidity : 60 %  
Antenna B

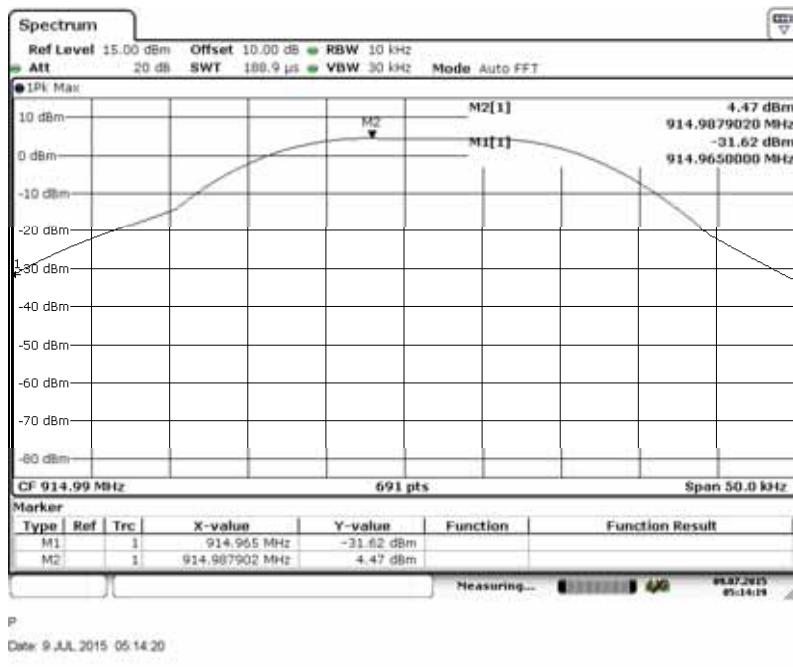
Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 1**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.54	30	PASS
Mid	4.47	30	PASS
High	3.21	30	PASS



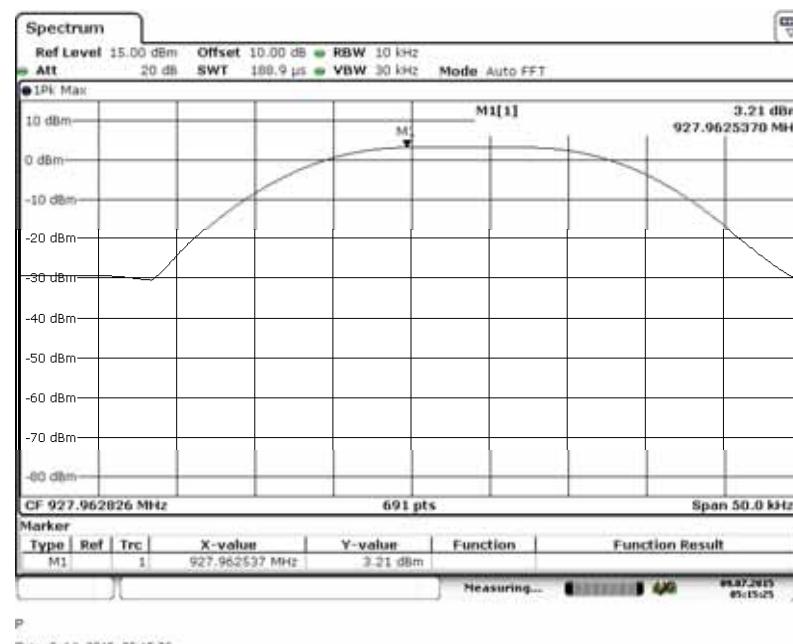
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

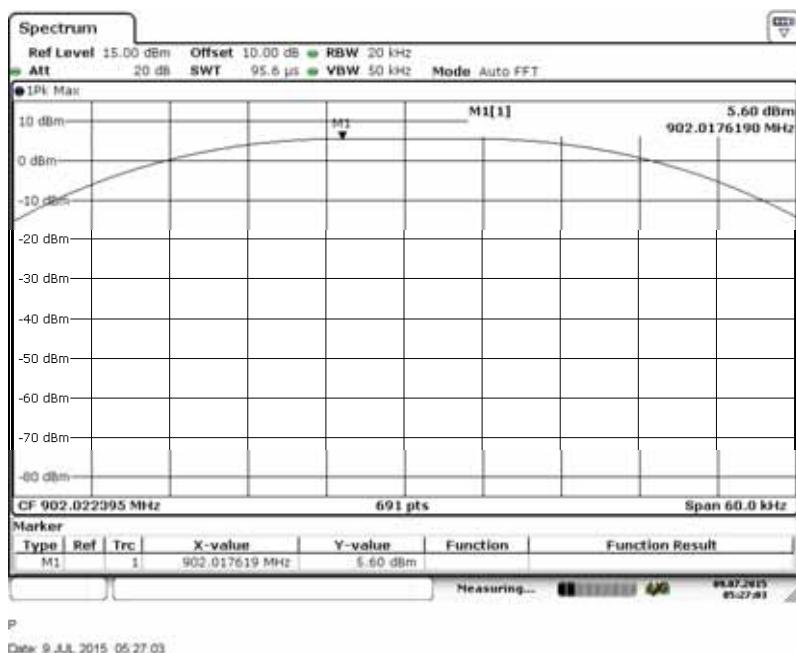
Conducted Power  
High Channel  
Antenna B



Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 2**

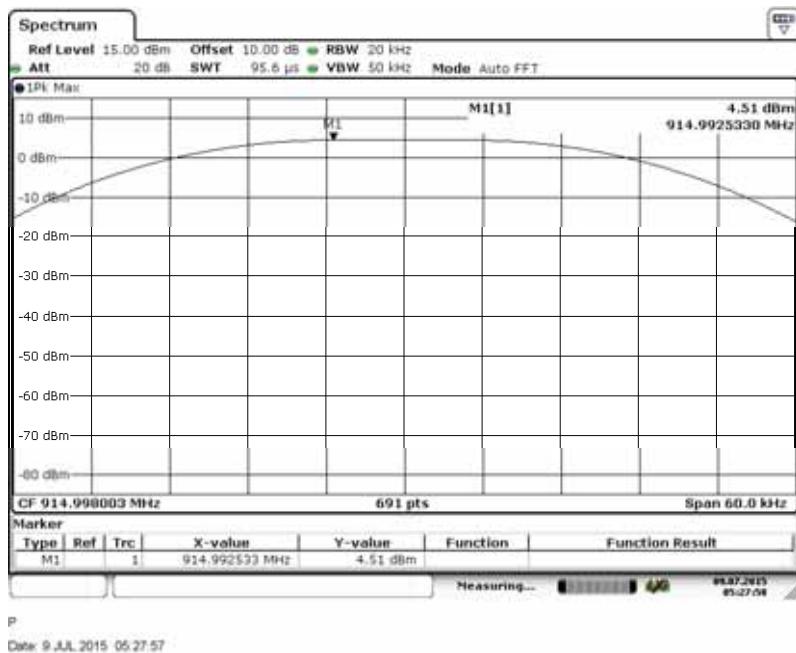
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.60	30	PASS
Mid	4.51	30	PASS
High	3.25	30	PASS

Test Model | Conducted Power  
 Low Channel  
 Antenna B



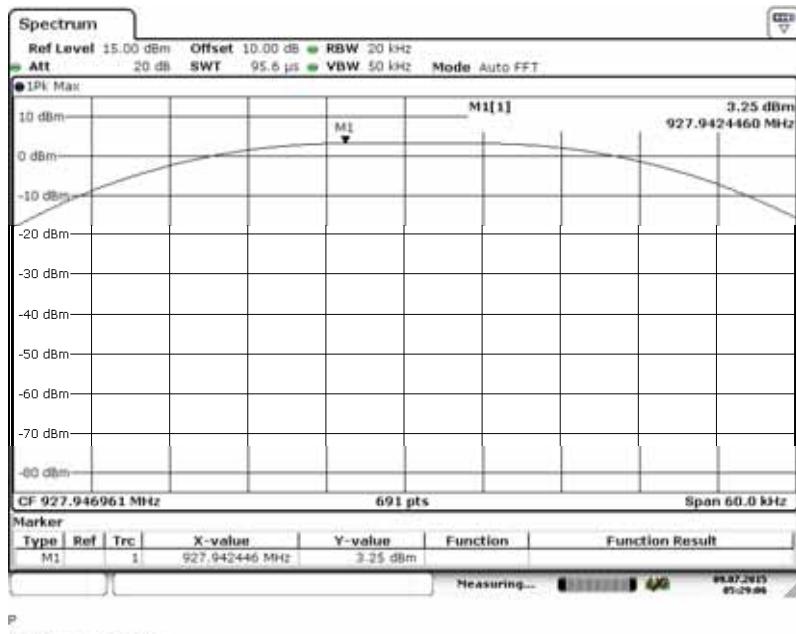
## Test Model

## Conducted Power Mid Channel Antenna B



## Test Model

Conducted Power  
High Channel  
Antenna B

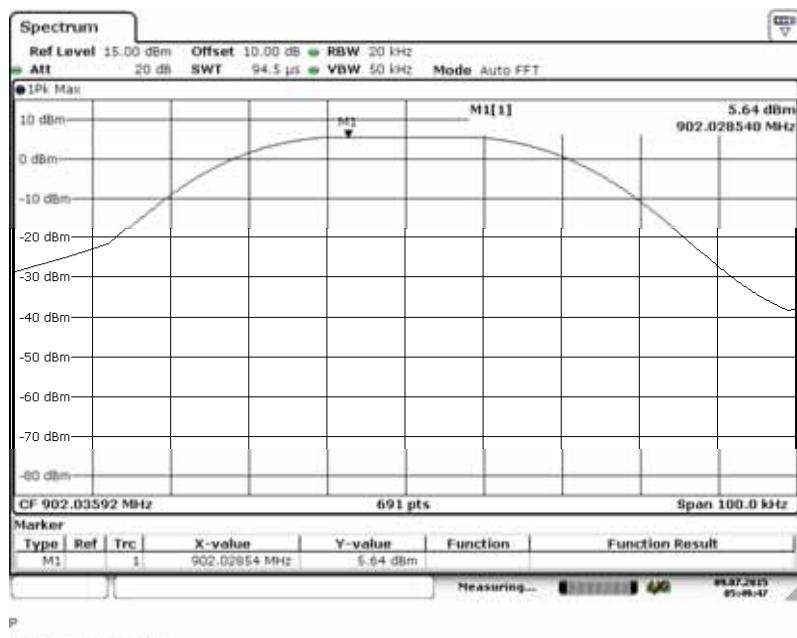


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 3**

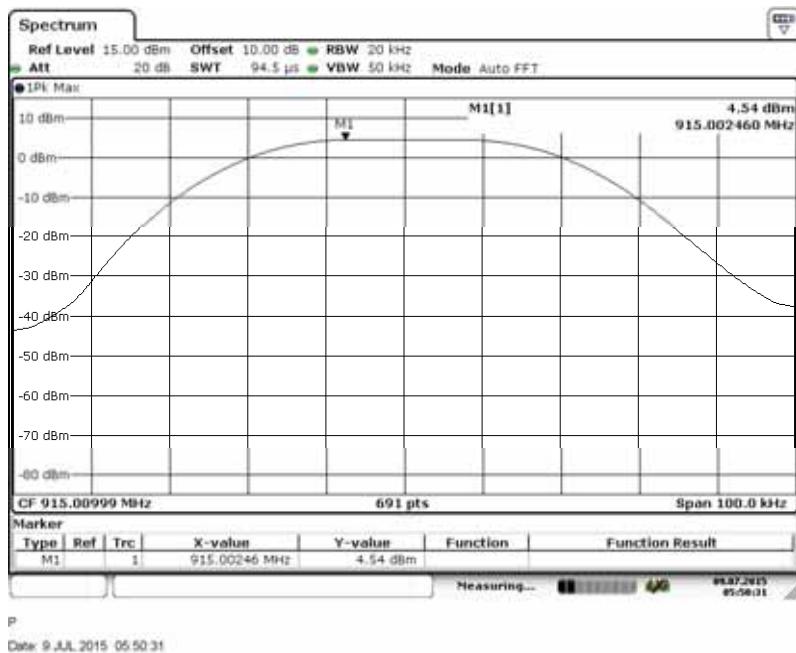
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.64	30	PASS
Mid	4.54	30	PASS
High	3.28	30	PASS

Test Model | Conducted Power  
Low Channel  
Antenna B



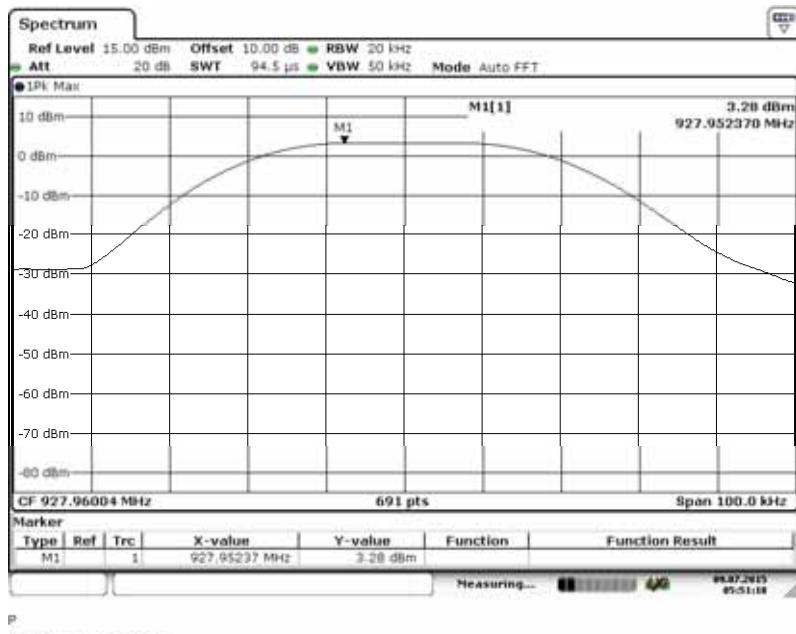
## Test Model

## Conducted Power Mid Channel Antenna B



## Test Model

Conducted Power  
High Channel  
Antenna B

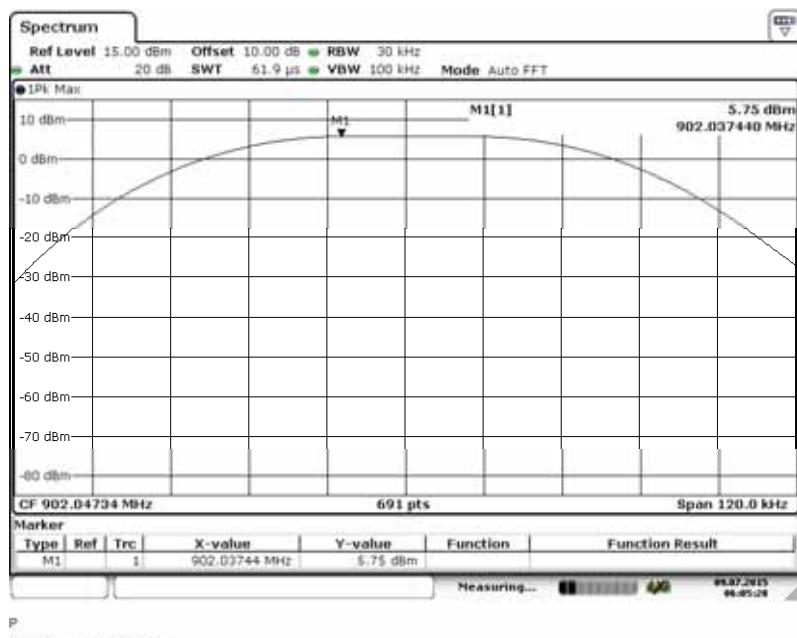


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 4**

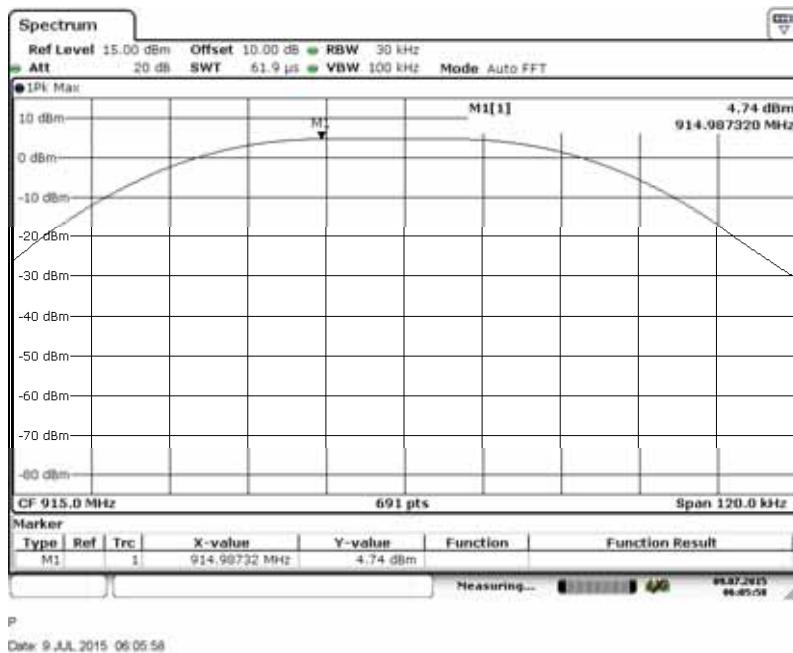
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.75	30	PASS
Mid	4.74	30	PASS
High	3.46	30	PASS

Test Model | Conducted Power  
Low Channel  
Antenna B



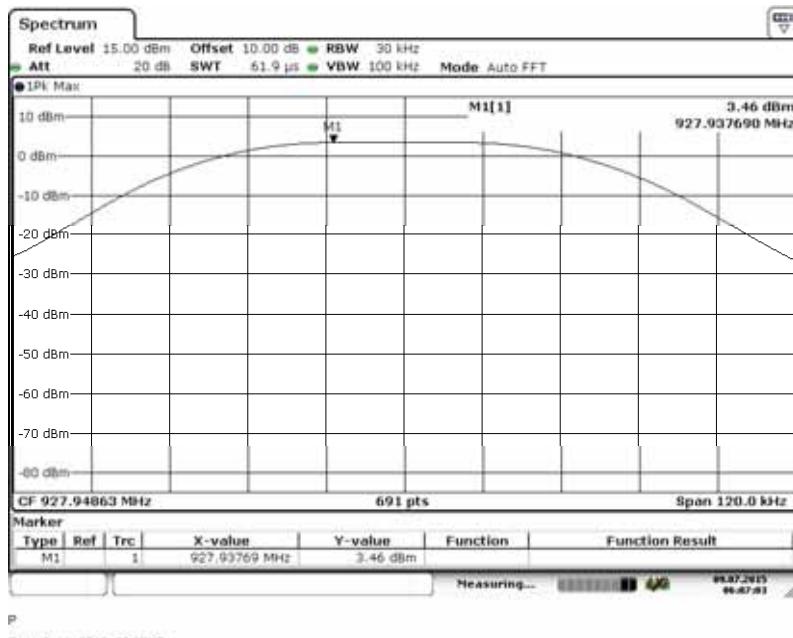
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B

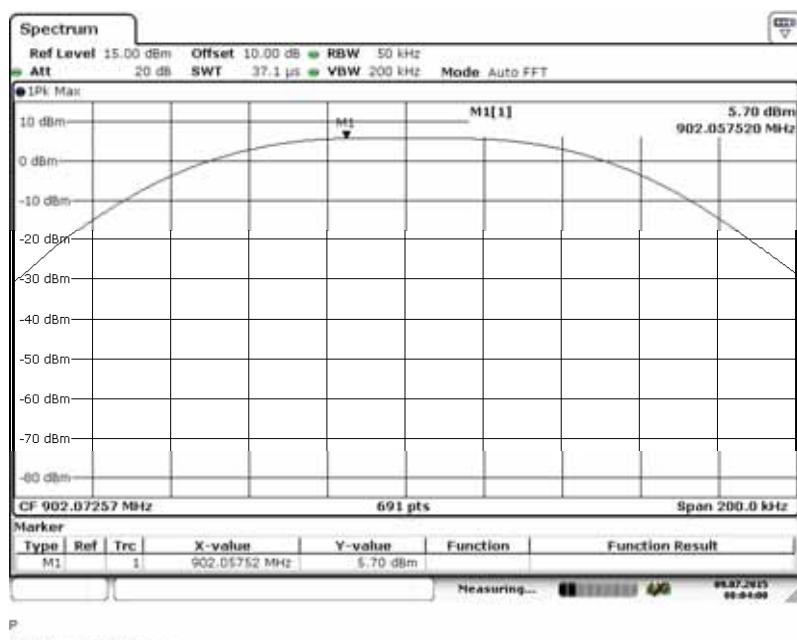


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 5**

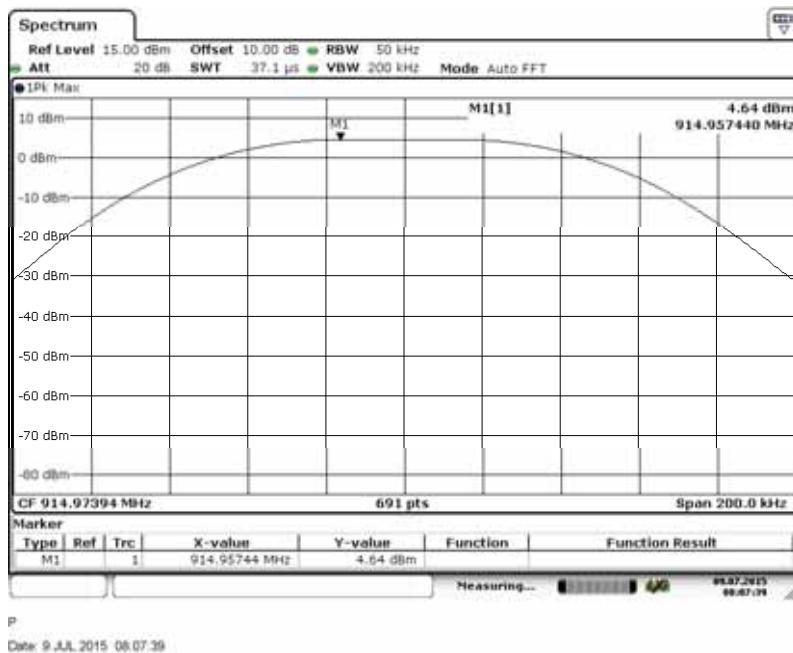
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.70	30	PASS
Mid	4.74	30	PASS
High	3.46	30	PASS

Test Model | Conducted Power  
Low Channel  
Antenna B



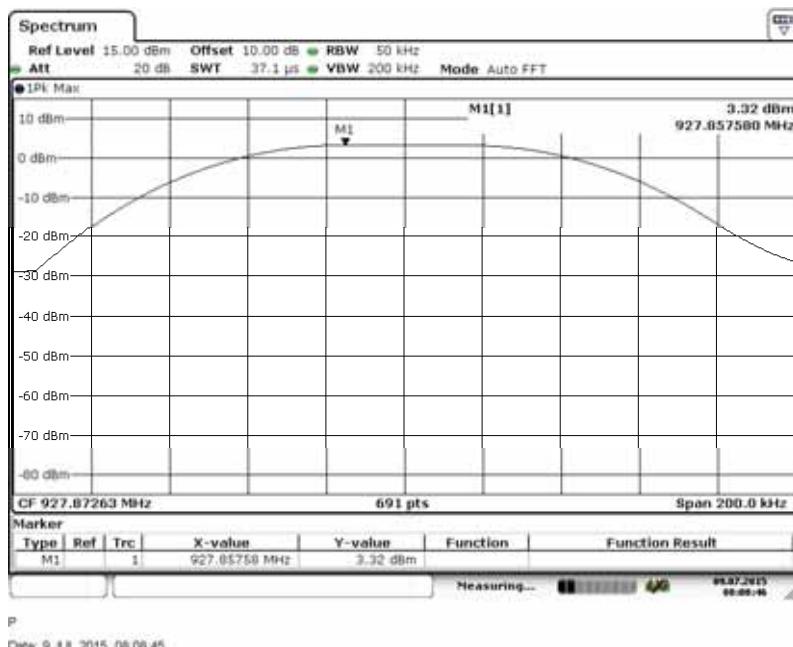
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B

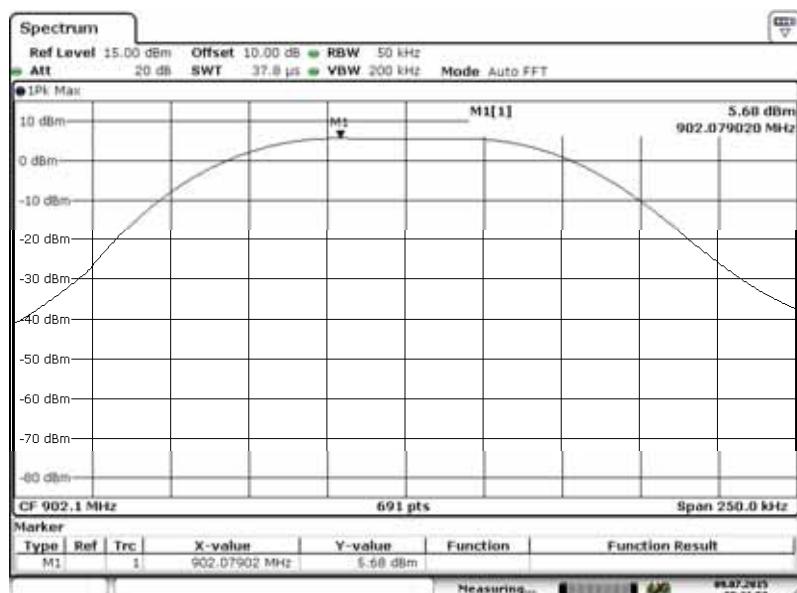


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 6**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.68	30	PASS
Mid	4.64	30	PASS
High	3.32	30	PASS

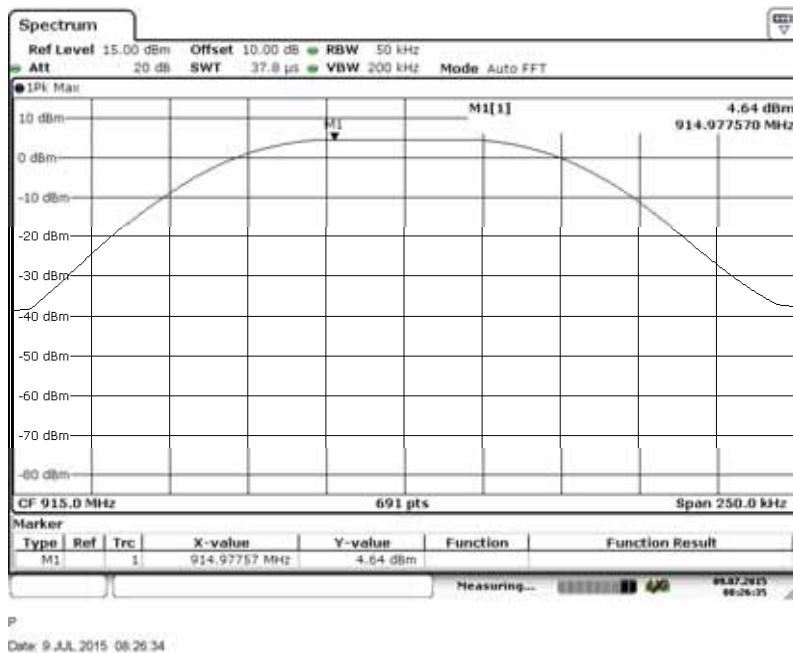
Test Model | Conducted Power  
Low Channel  
Antenna B



P  
Date: 9 JUL 2015 08:21:59

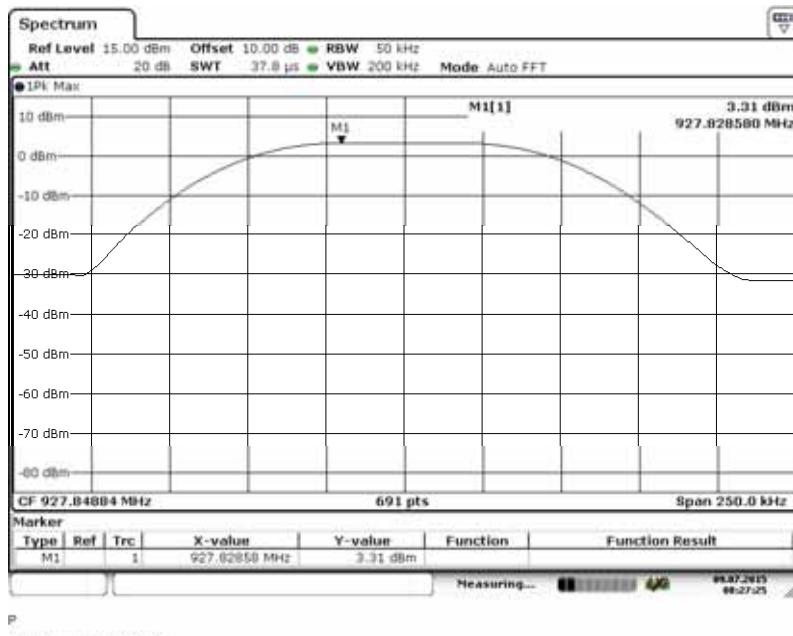
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B

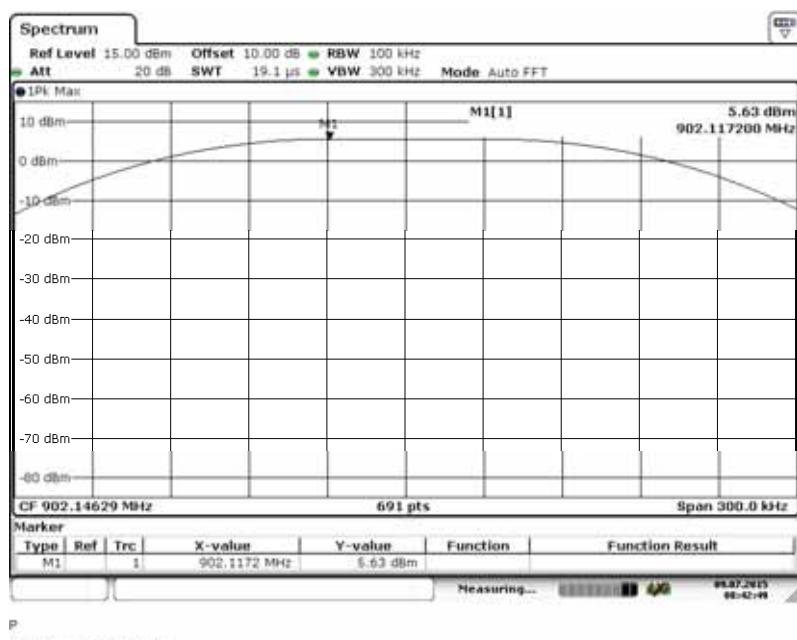


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 7**

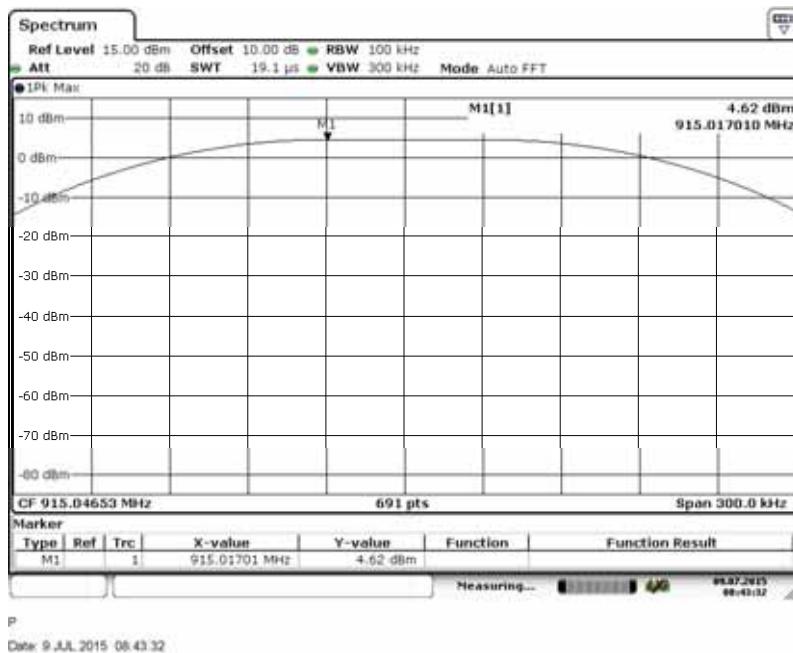
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.63	30	PASS
Mid	4.62	30	PASS
High	3.92	30	PASS

Test Model | Conducted Power  
Low Channel  
Antenna B



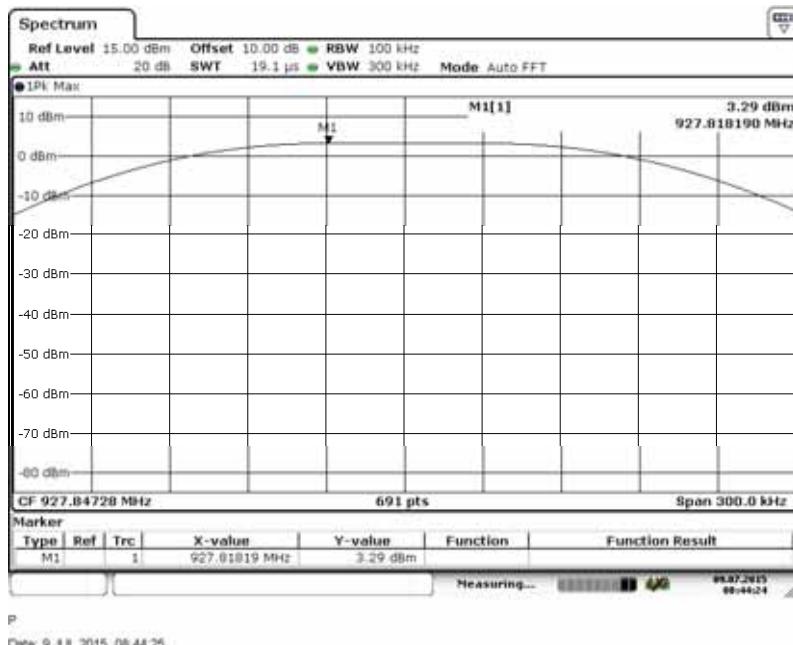
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B

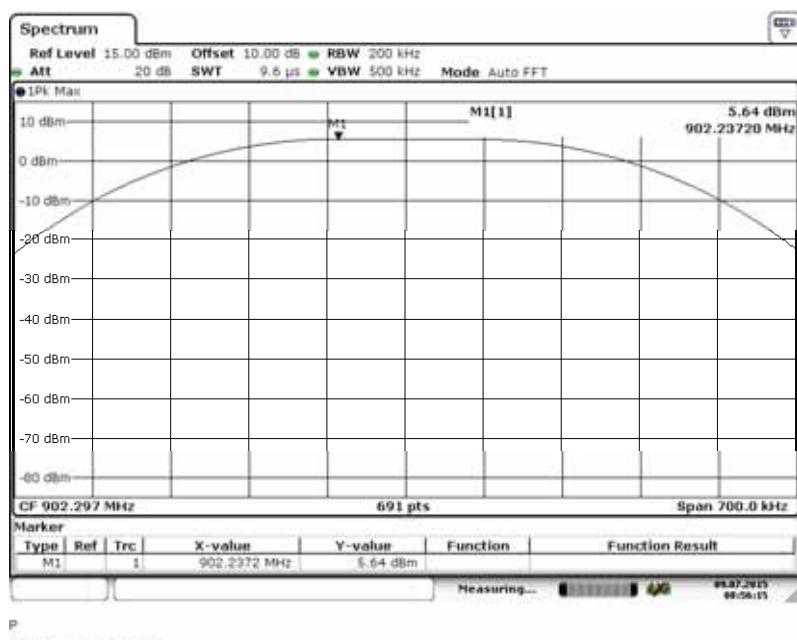


Temperature : 26  
Humidity : 60 %  
Antenna B

Test Date : July 09, 2015  
Test By: King Kong  
**BandWidth 8**

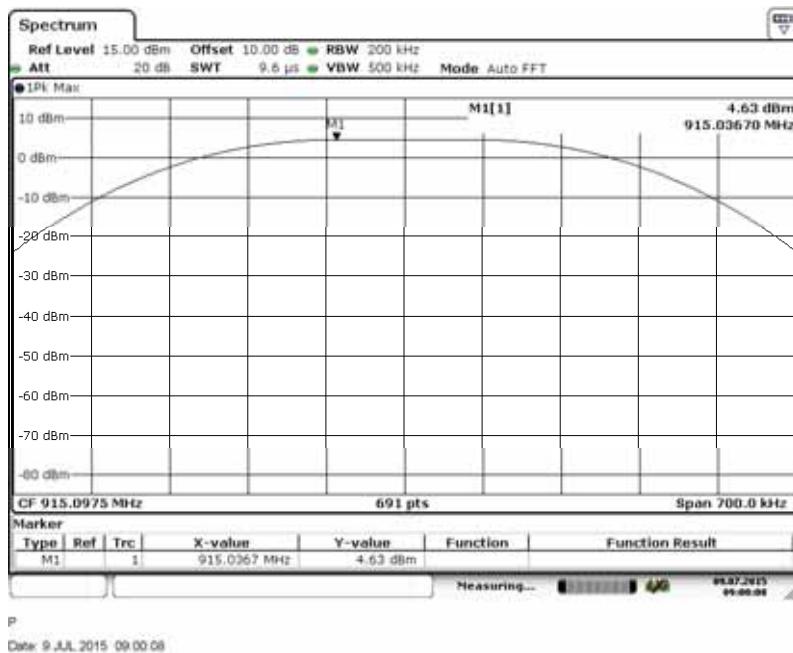
Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	5.64	30	PASS
Mid	4.63	30	PASS
High	3.35	30	PASS

Test Model | Conducted Power  
Low Channel  
Antenna B



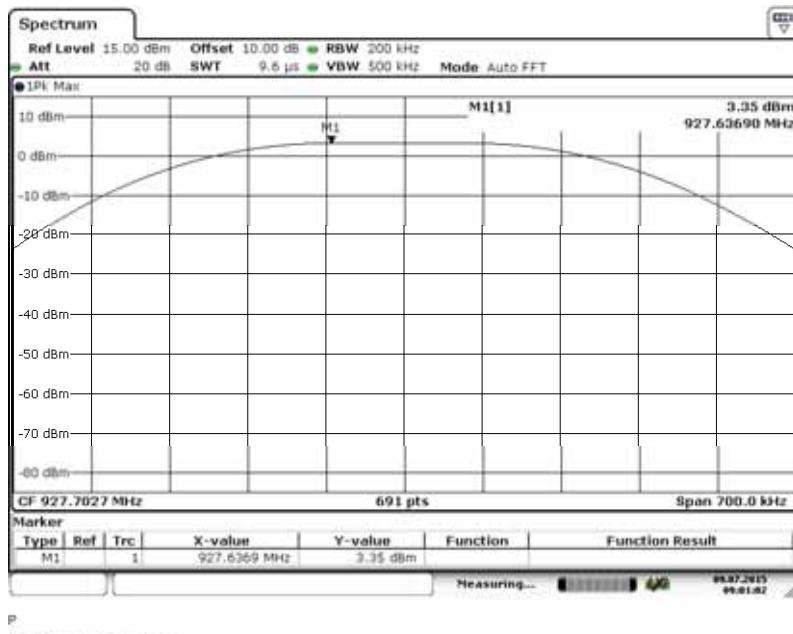
Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B



Temperature : 26  
 Humidity : 60 %  
 Antenna B

Test Date : April 27, 2015  
 Test By: King Kong  
**BandWidth 9**

Channel	Measurement Level (dBm)	Limit (dBm)	Verdict
Low	-2.364	30	PASS
Mid	-1.394	30	PASS
High	-0.463	30	PASS



Test Model

Conducted Power  
Mid Channel  
Antenna B



Test Model

Conducted Power  
High Channel  
Antenna B



## 9.6 BANDS EDGE

### **Applicable Standard**

According to FCC Part 15.247(d) and KDB 558074 DTS 01 Meas. Guidance v03r02

### **Conformance Limit**

According to FCC Part 15.247(d):

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.

### **Test Configuration**

Test according to clause 7.1 radio frequency test setup 1

### **Test Procedure**

The transmitter output (antenna port) was connected to the spectrum analyzer

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation

Set the RBW  $\geq$  1% of the span.

Set the VBW  $\geq$  RBW.

Set Detector = peak.

Set Sweep time = auto couple.

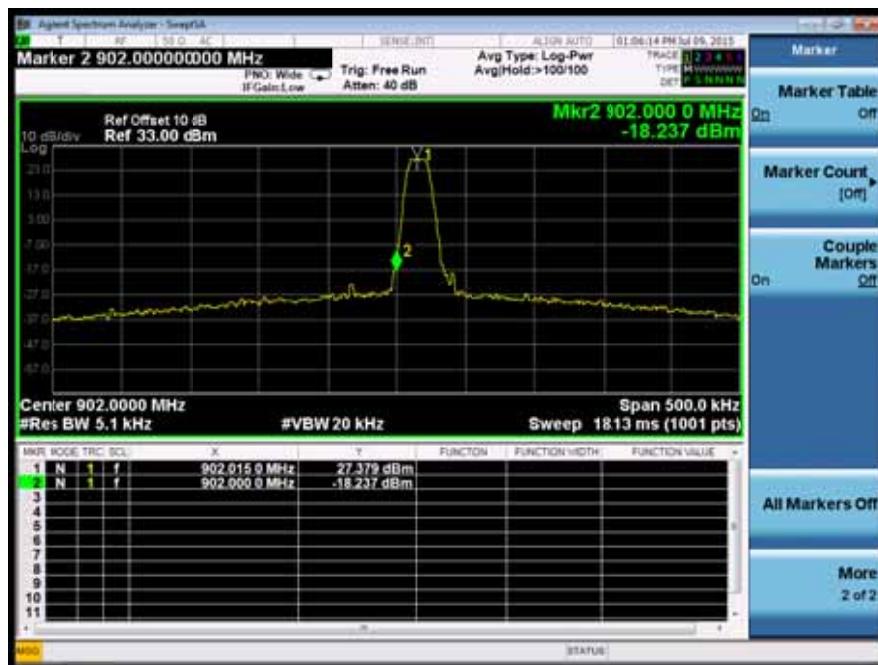
Set Trace mode = max hold.

Allow trace to fully stabilize.

### Test Results

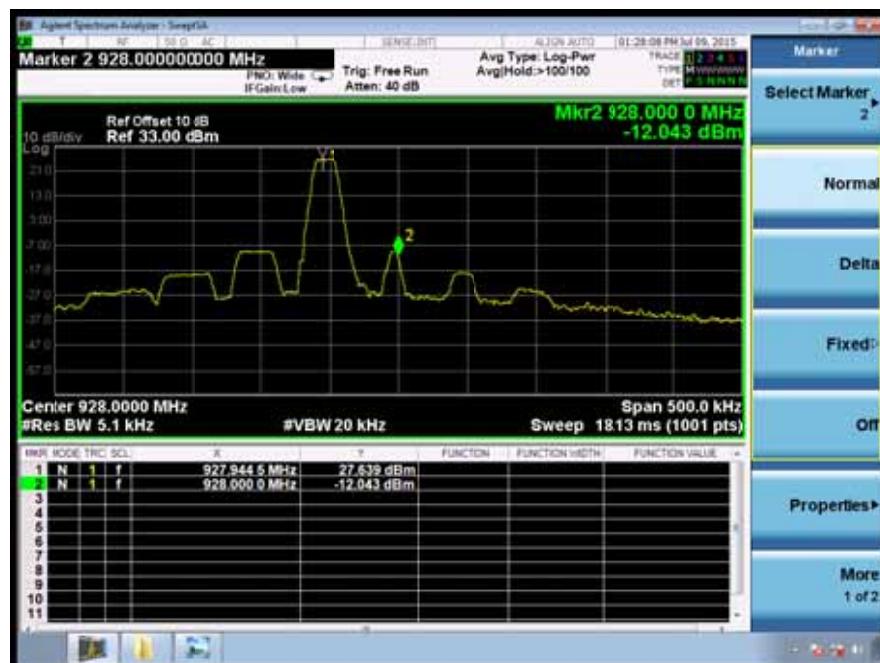
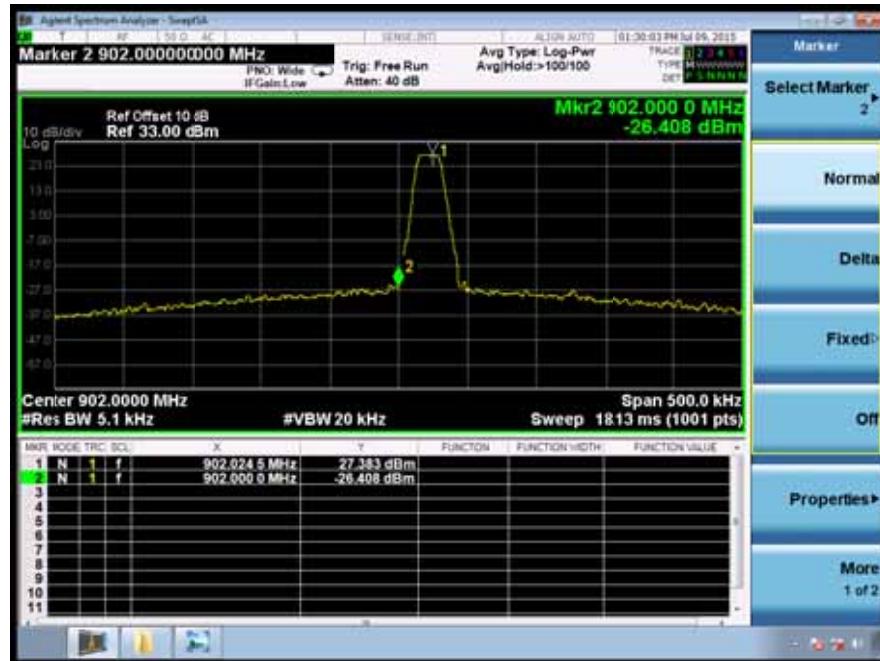
Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 1**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	45.616	Peak	20	Pass
High Channel	40.550	Peak	20	Pass



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 2**

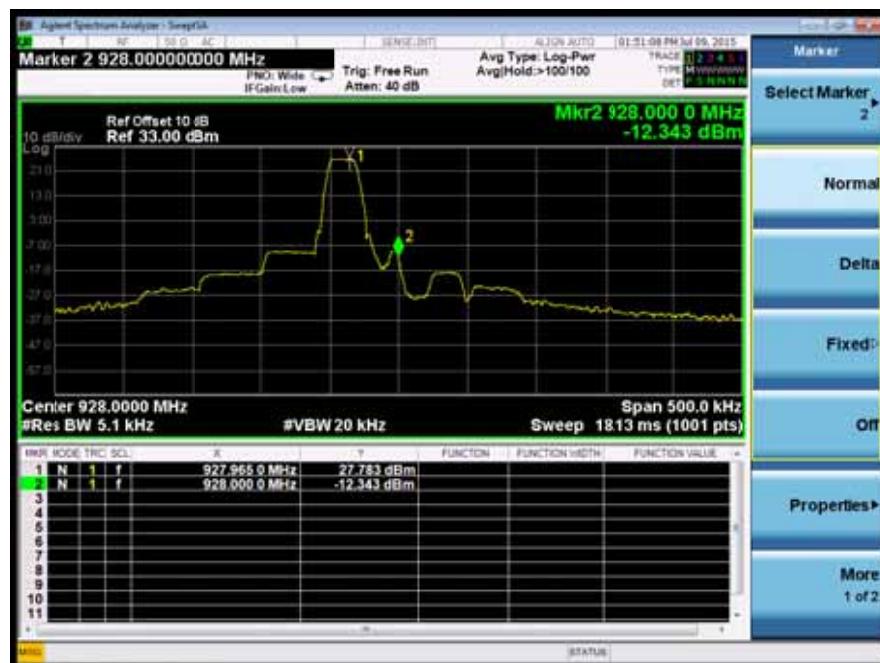
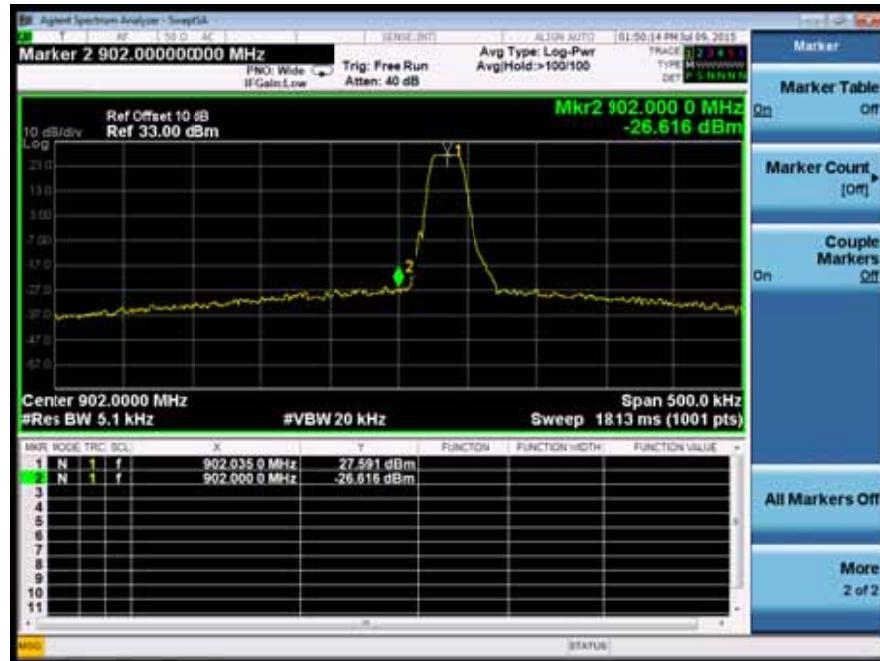
Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	53.791	Peak	20	Pass
High Channel	39.682	Peak	20	Pass



Temperature : 26  
Humidity : 60 %  
Antenna A

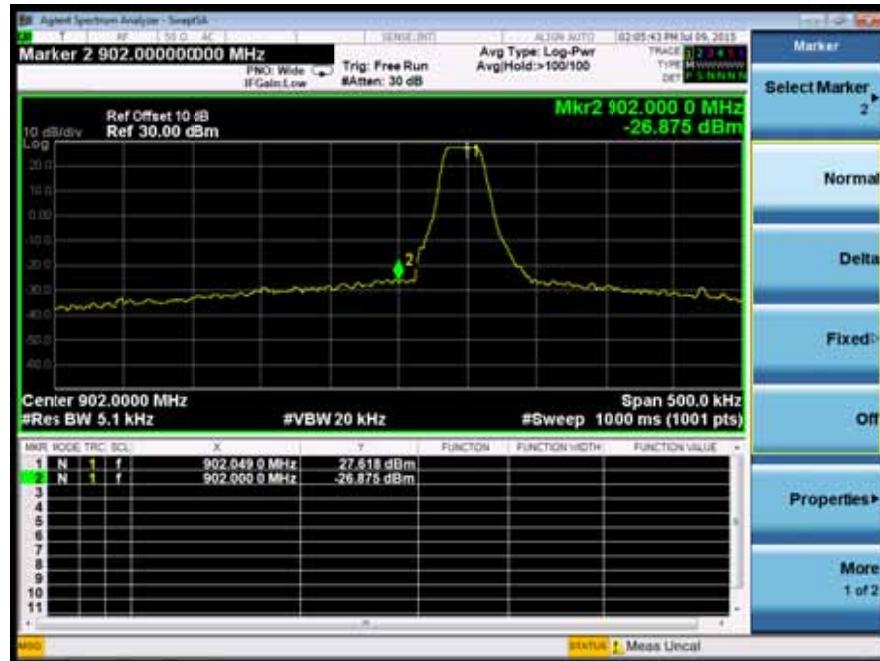
Test Date : April 27, 2015  
Test By: King Kong  
**BandWidth 3**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	54.207	Peak	20	Pass
High Channel	40.126	Peak	20	Pass



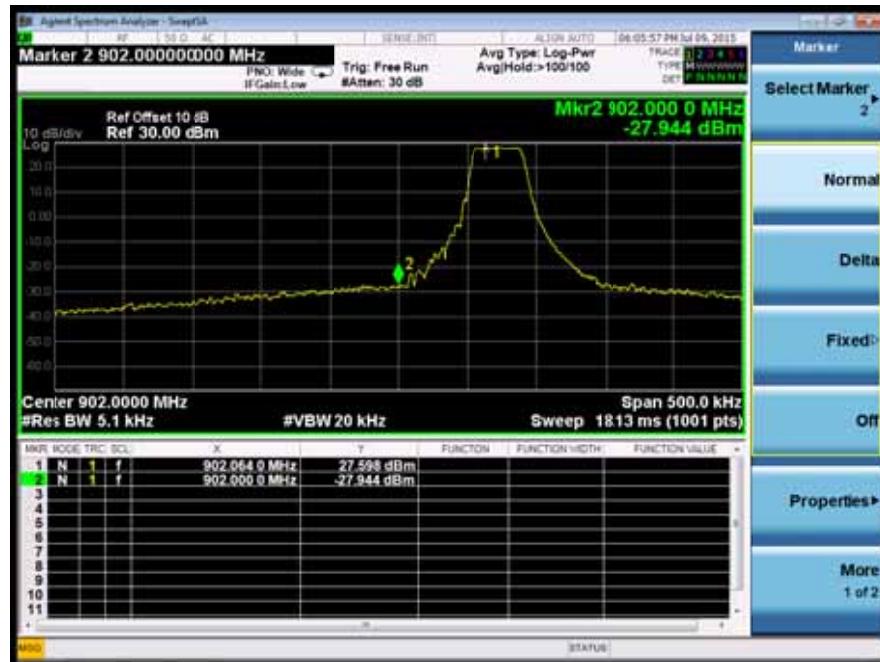
Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 4**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	54.493	Peak	20	Pass
High Channel	39.626	Peak	20	Pass



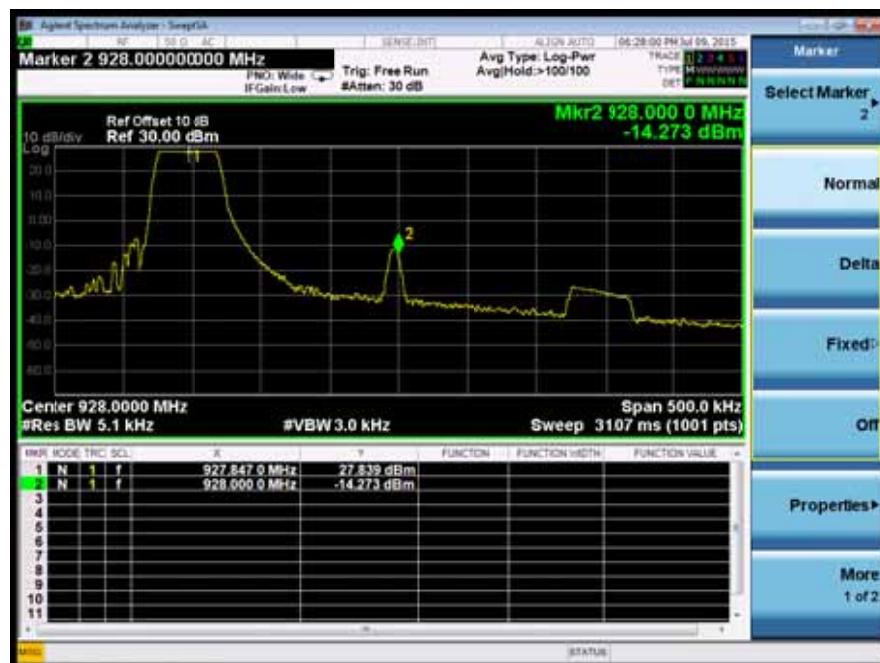
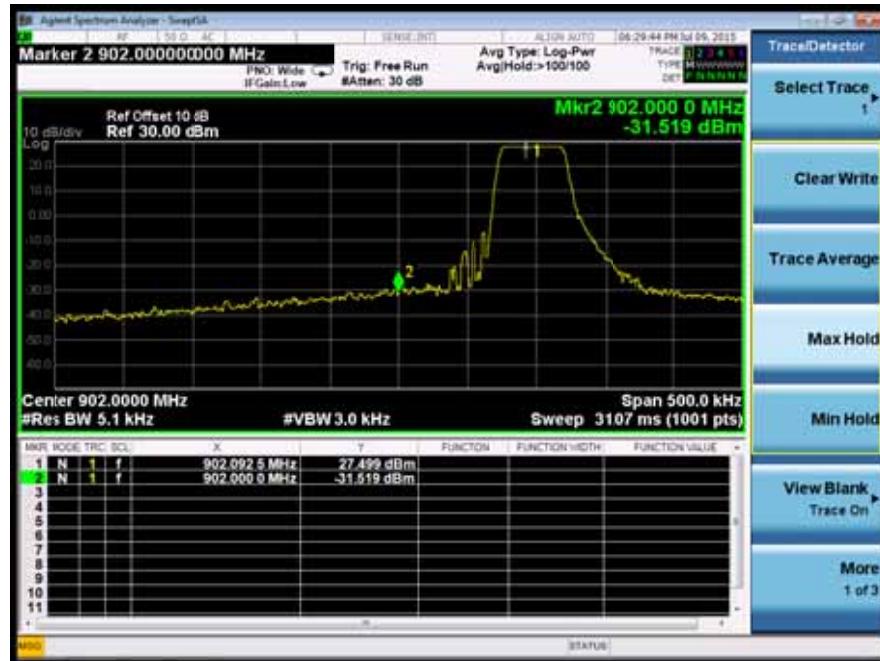
Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 5**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	55.542	Peak	20	Pass
High Channel	41.341	Peak	20	Pass



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 6**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	59.108	Peak	20	Pass
High Channel	42.112	Peak	20	Pass



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 7**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	59.905	Peak	20	Pass
High Channel	41.628	Peak	20	Pass



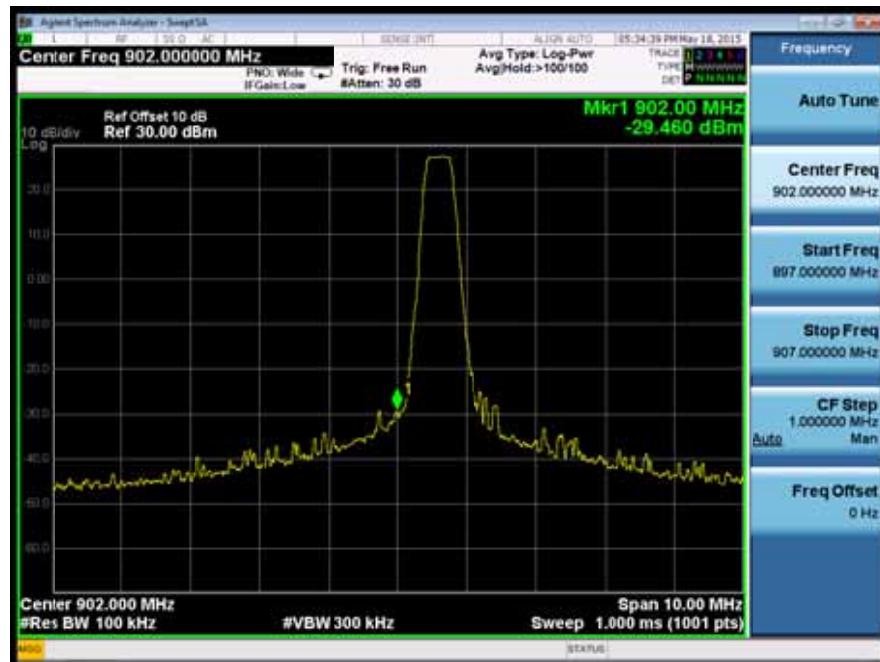
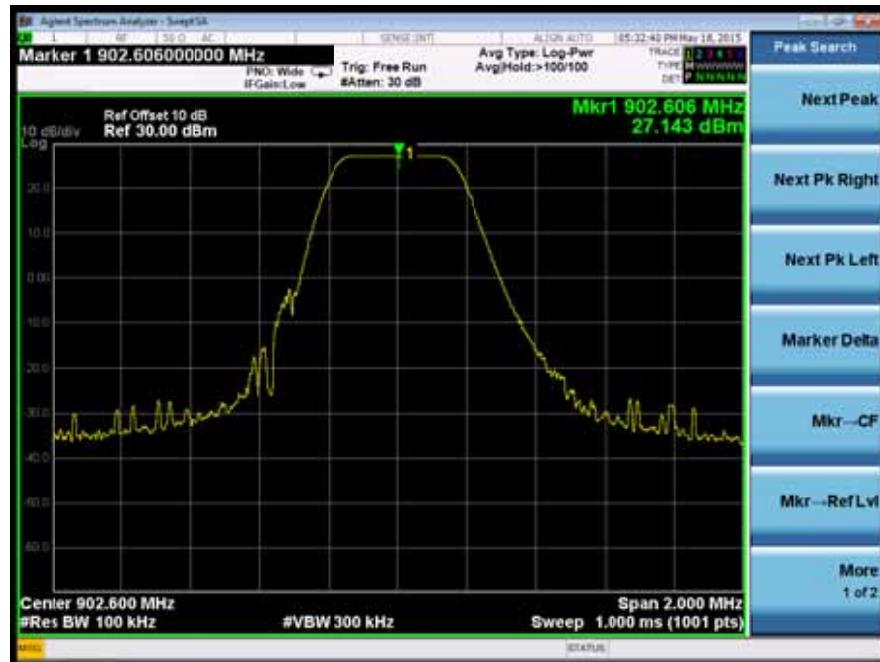
Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 8**

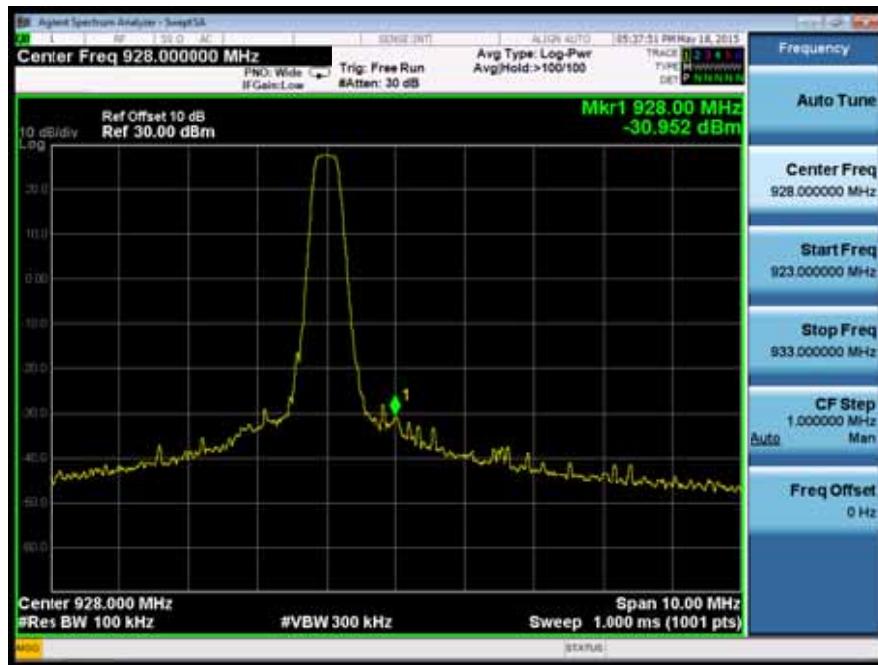
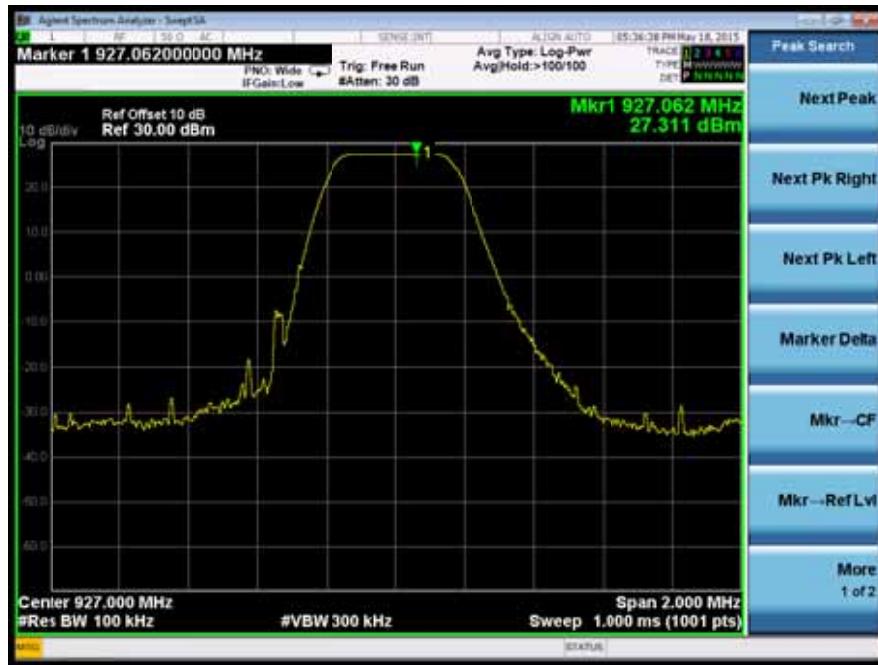
Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	61.801	Peak	20	Pass
High Channel	44.379	Peak	20	Pass



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna A **BandWidth 9**

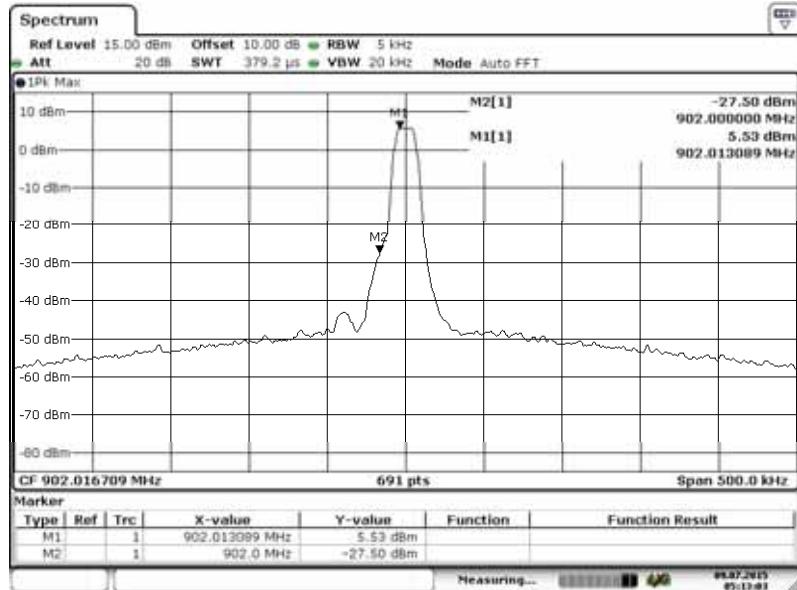
Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	56.603	Peak	20	Pass
High Channel	58.263	Peak	20	Pass



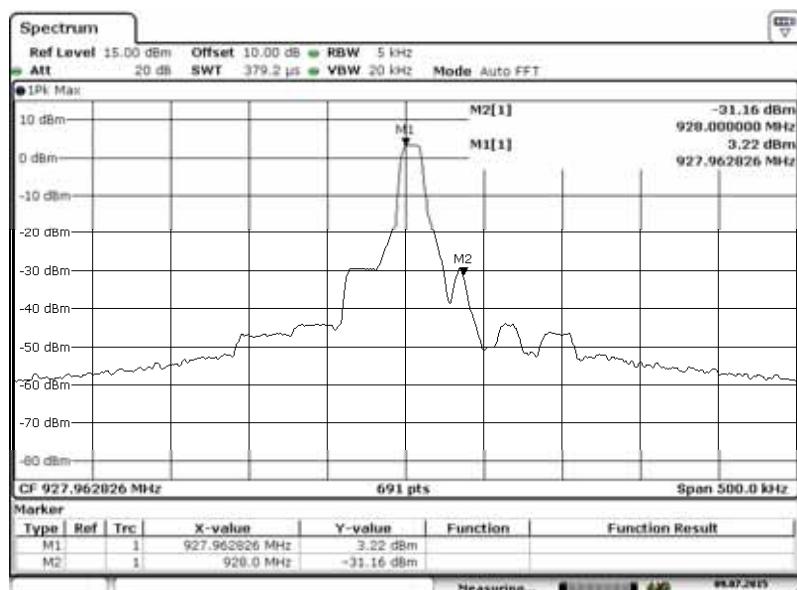


Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 1**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	33.03	Peak	20	Pass
High Channel	34.28	Peak	20	Pass



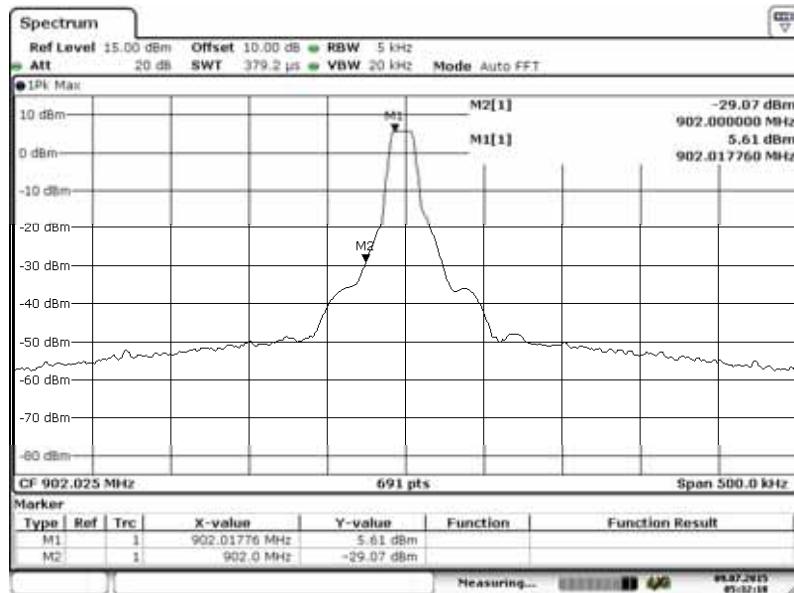
P  
 Date: 9 JUL 2015 05:13:03



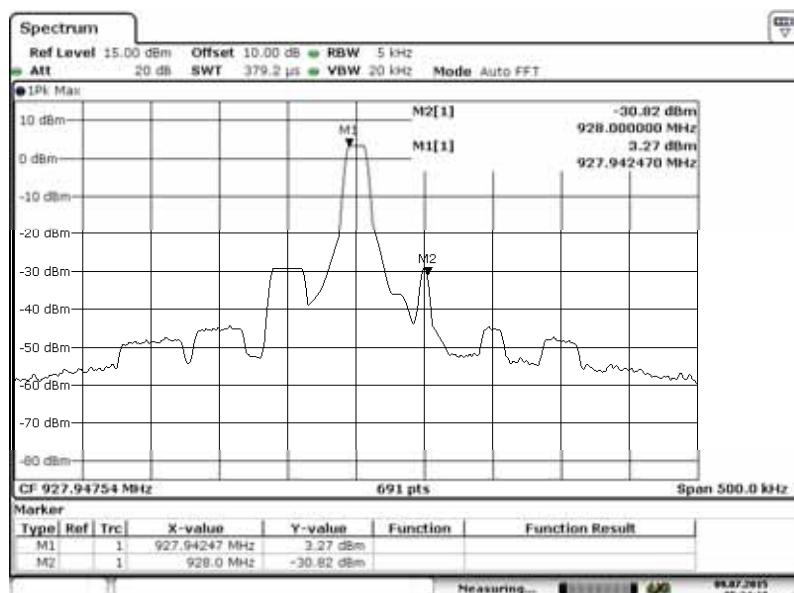
P  
 Date: 9 JUL 2015 05:16:42

Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 2**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	34.68	Peak	20	Pass
High Channel	34.09	Peak	20	Pass



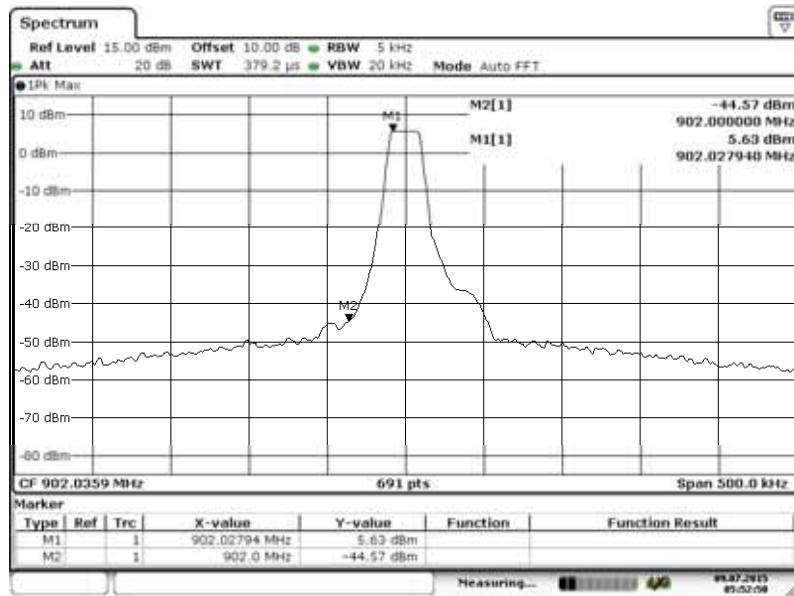
P  
 Date: 9 JUL 2015 05:32:18



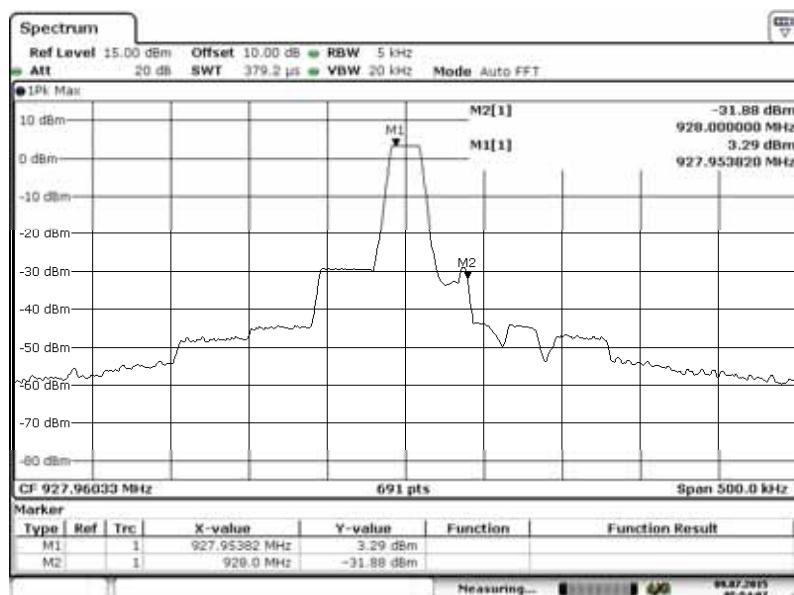
P  
 Date: 9 JUL 2015 05:34:09

Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 3**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	50.20	Peak	20	Pass
High Channel	35.17	Peak	20	Pass



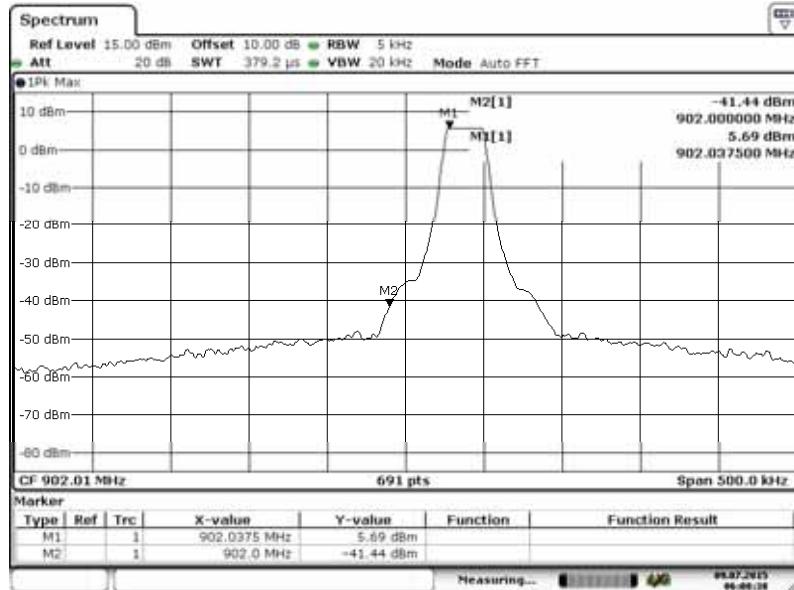
P  
 Date: 9 JUL 2015 05:52:50



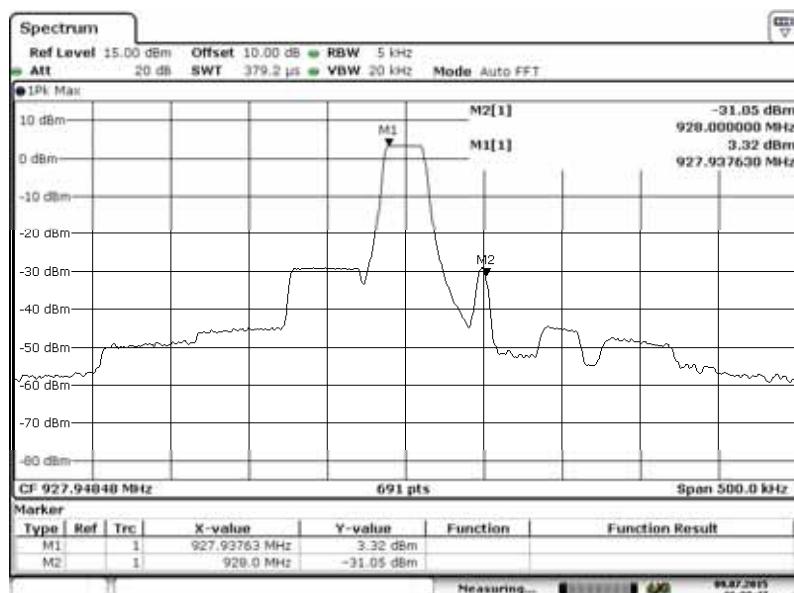
P  
 Date: 9 JUL 2015 05:54:07

Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 4**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	47.13	Peak	20	Pass
High Channel	34.37	Peak	20	Pass



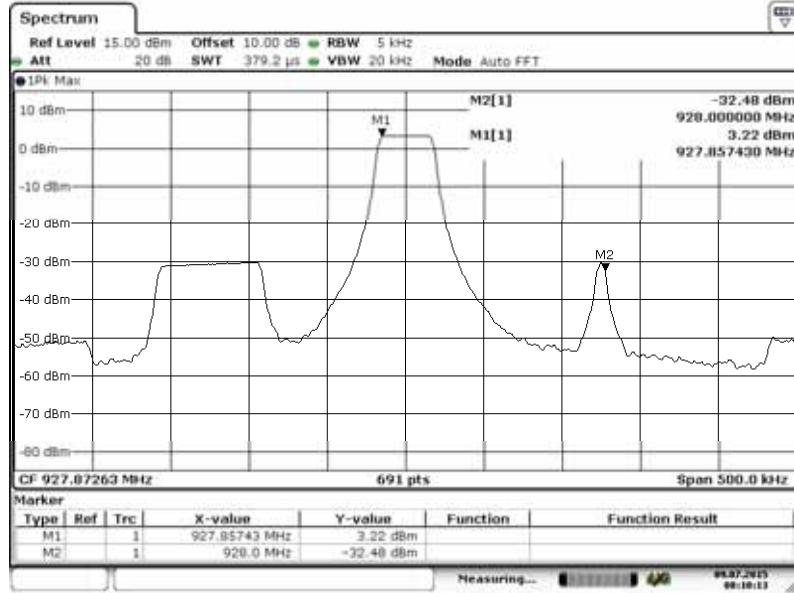
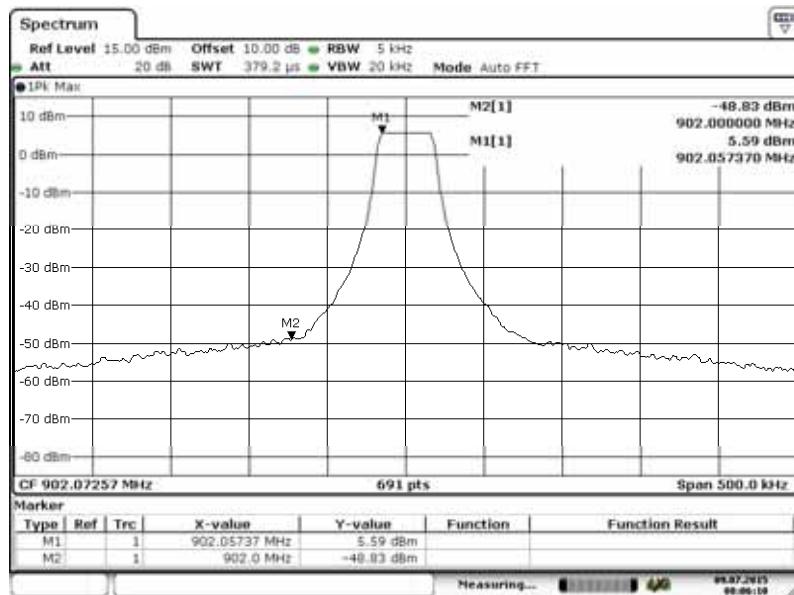
P  
 Date: 9 JUL 2015 06:08:38



P  
 Date: 9 JUL 2015 06:09:48

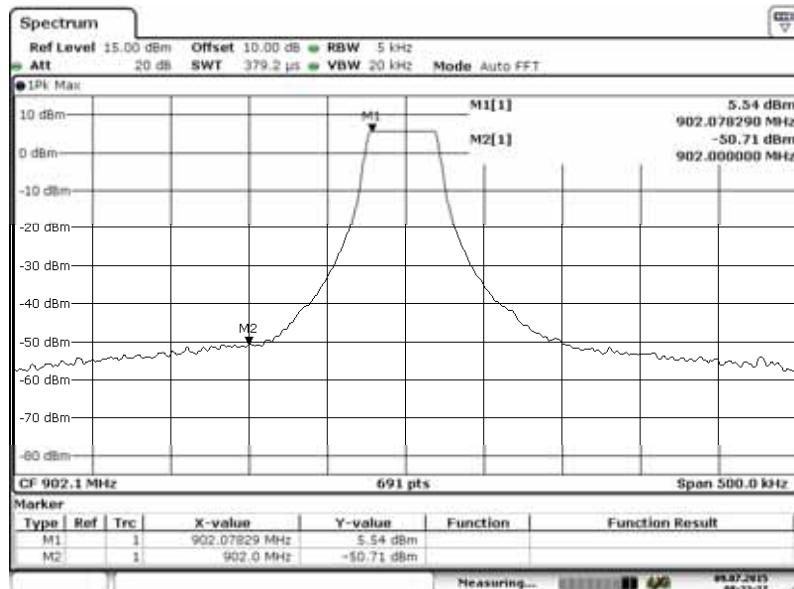
Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 5**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	54.42	Peak	20	Pass
High Channel	35.70	Peak	20	Pass

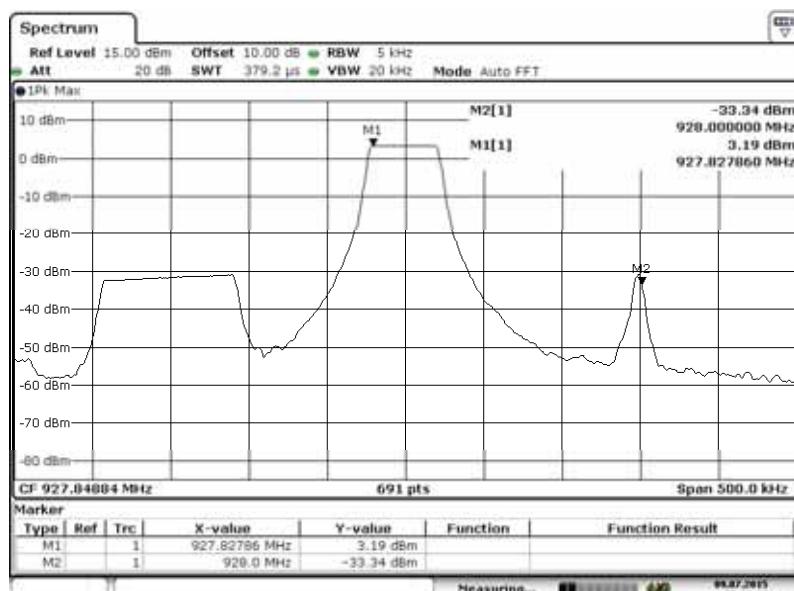


Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 6**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	56.25	Peak	20	Pass
High Channel	36.53	Peak	20	Pass



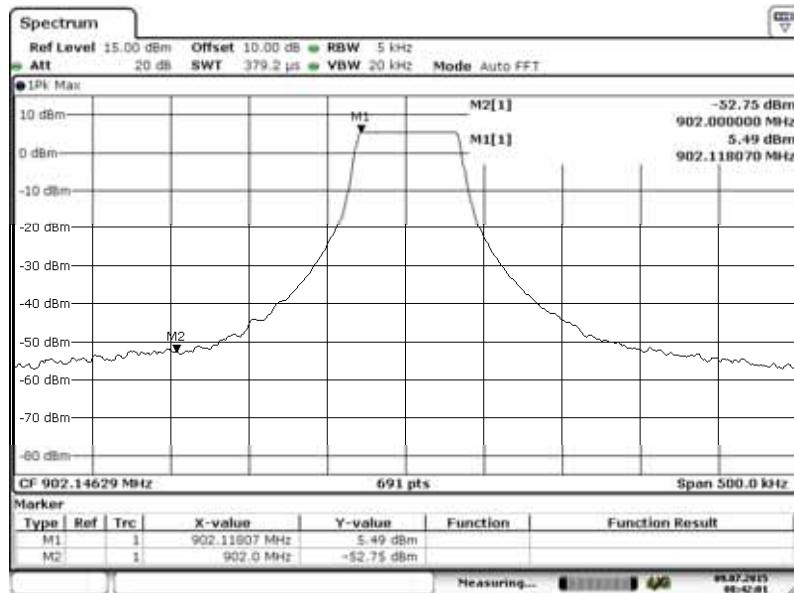
P  
 Date: 9 JUL 2015 08:23:37



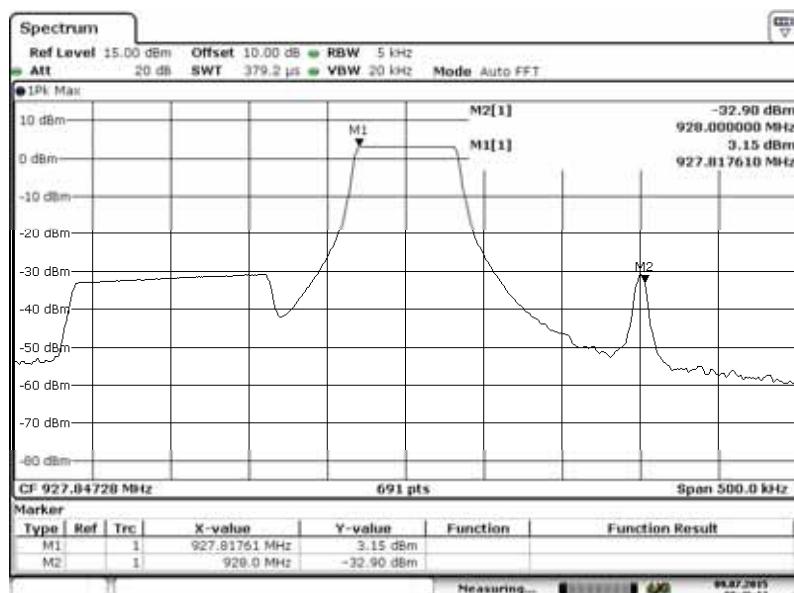
P  
 Date: 9 JUL 2015 08:26:22

Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 7**

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	58.24	Peak	20	Pass
High Channel	36.05	Peak	20	Pass



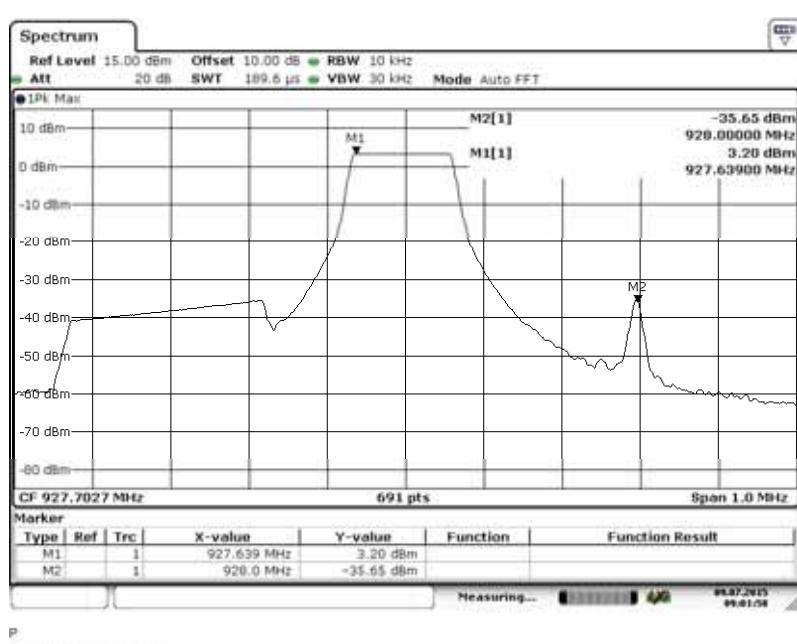
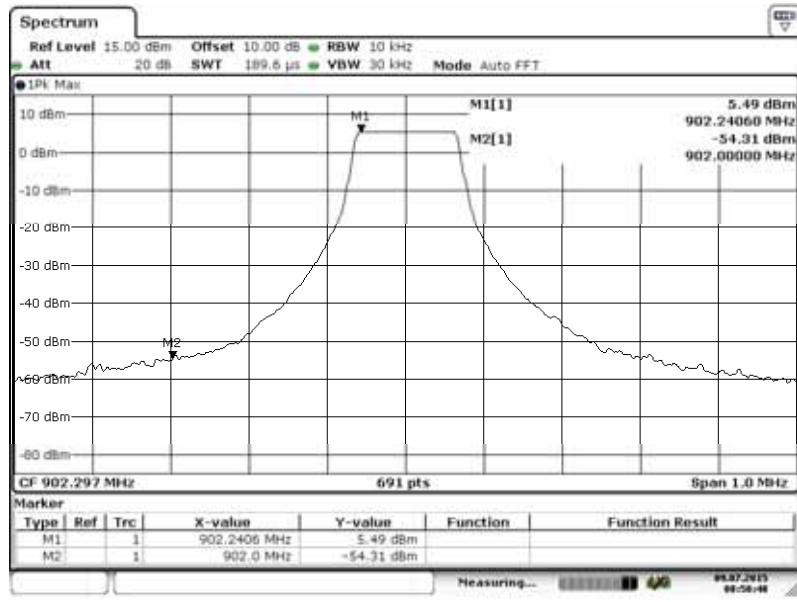
P  
 Date: 9 JUL 2015 08:42:01



P  
 Date: 9 JUL 2015 08:46:12

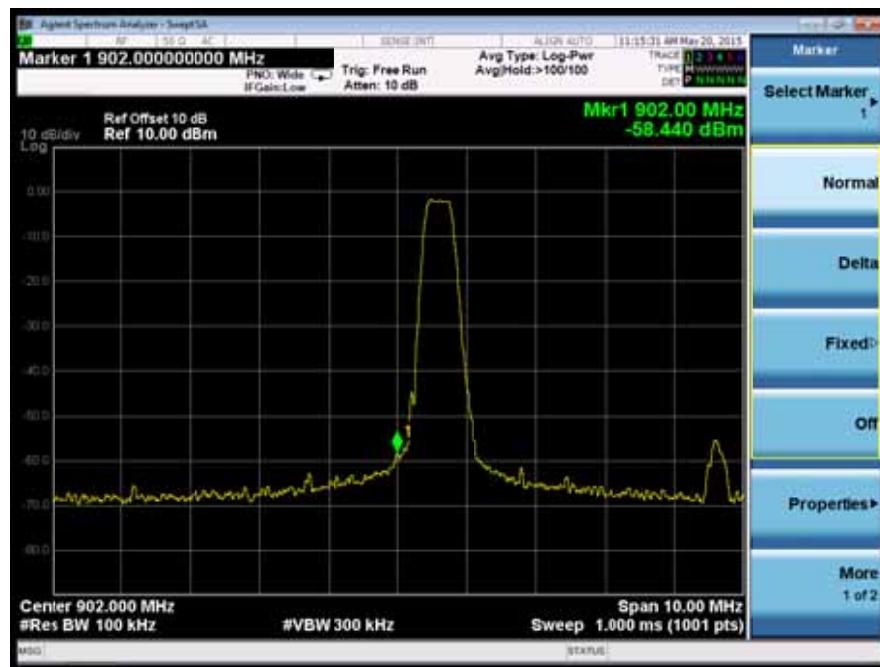
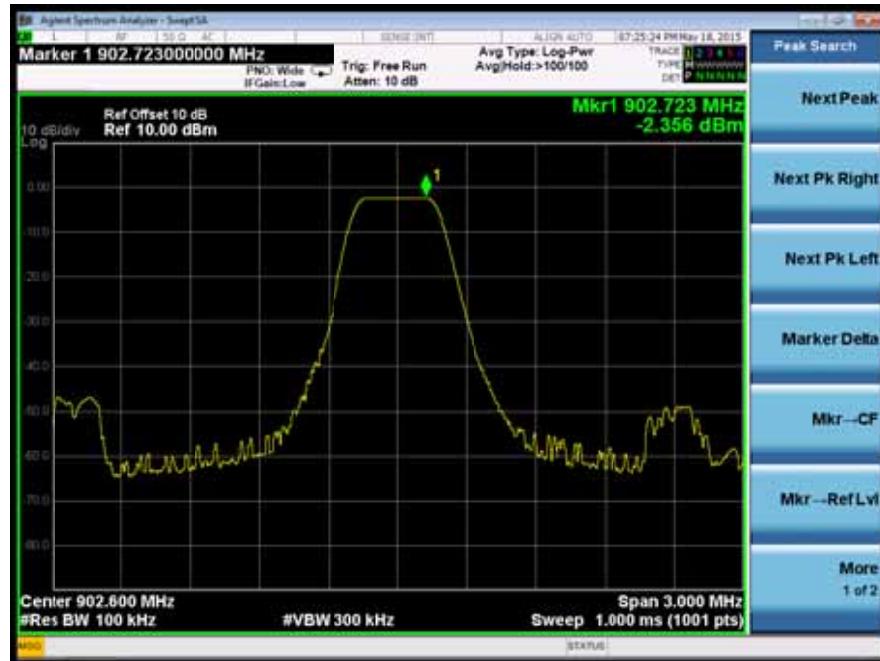
Temperature : 26 Test Date : July 09, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B **BandWidth 8**

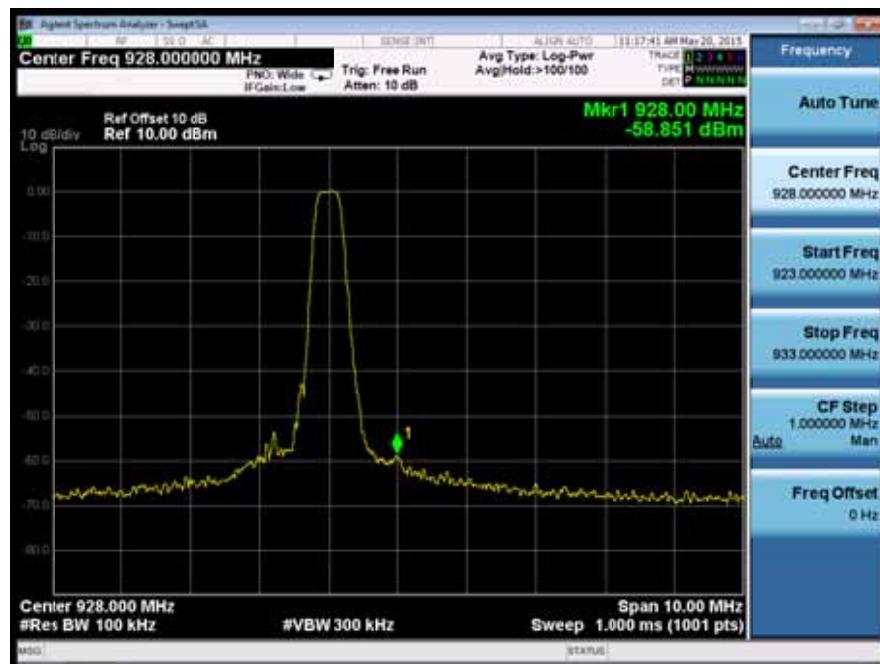
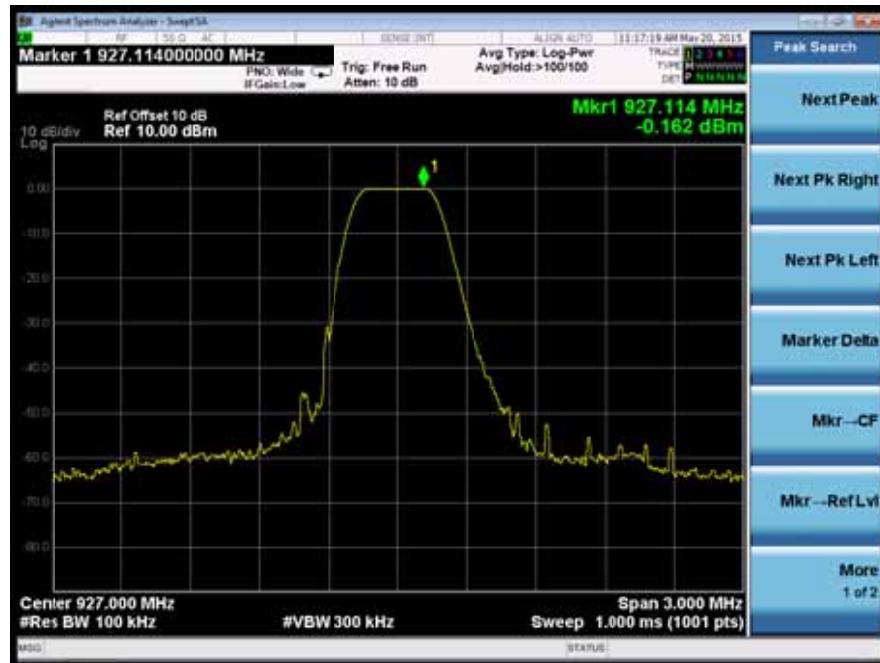
Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
Low Channel	59.80	Peak	20	Pass
High Channel	38.85	Peak	20	Pass



Temperature : 26 Test Date : April 27, 2015  
 Humidity : 60 % Test By: King Kong  
 Antenna B

Frequency(MHz)	Band edge Measured Level( )	Detector	Limit	Result
903.2	56.204	Peak	20	Pass
926.2	58.689	Peak	20	Pass





## 9.7 CONDUCTED SUPRIOUS EMISSION

### 9.7.1 Applicable Standard

According to FCC Part 15.247(d) and DA 00-705

### 9.7.2 Conformance Limit

According to FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

### 9.7.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 9.7.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

#### ■ Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DSS channel center frequency.

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

Set the RBW = 100 kHz. Set the VBW  $\geq$  3 x RBW.

Set Detector = peak. Set Sweep time = auto couple.

Set Trace mode = max hold. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum Maximum conducted level.

Note that the channel found to contain the maximum conducted level can be used to establish the reference level.

#### ■ Conducted Spurious RF Conducted Emission

Use the following spectrum analyzer settings:

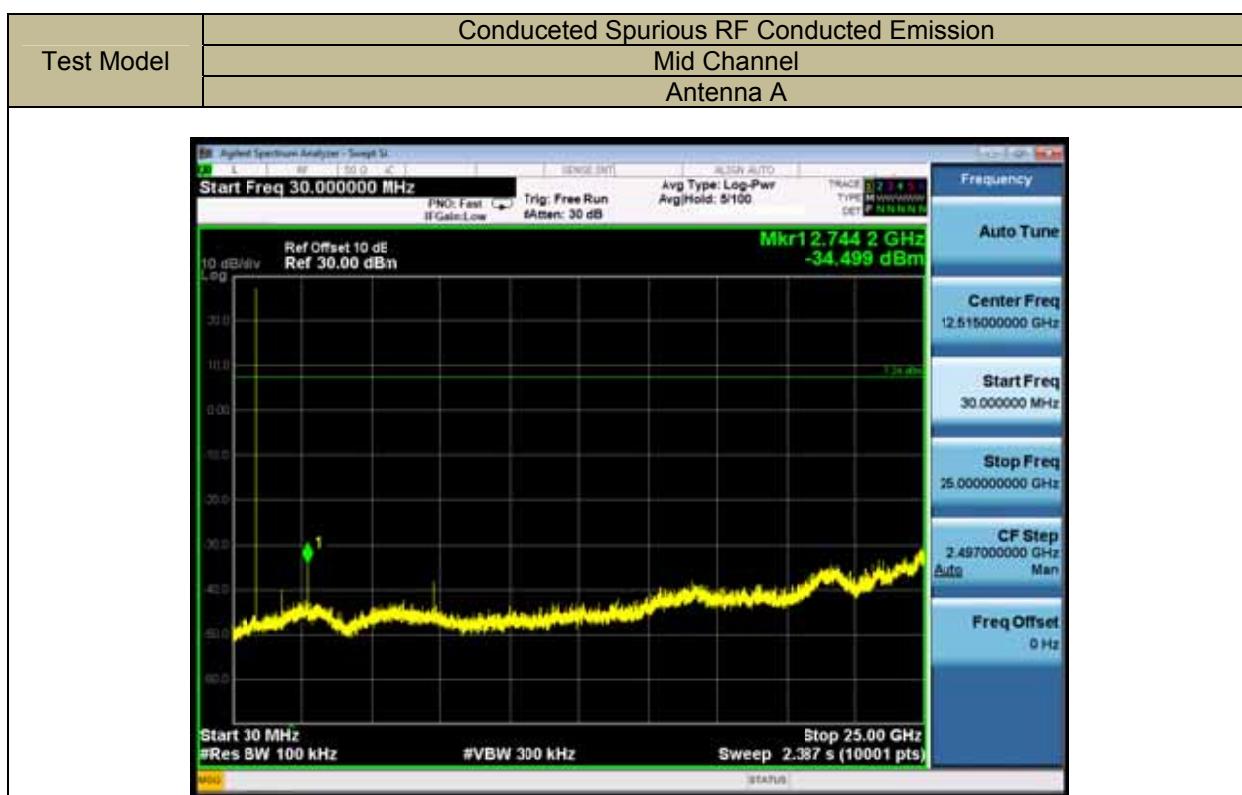
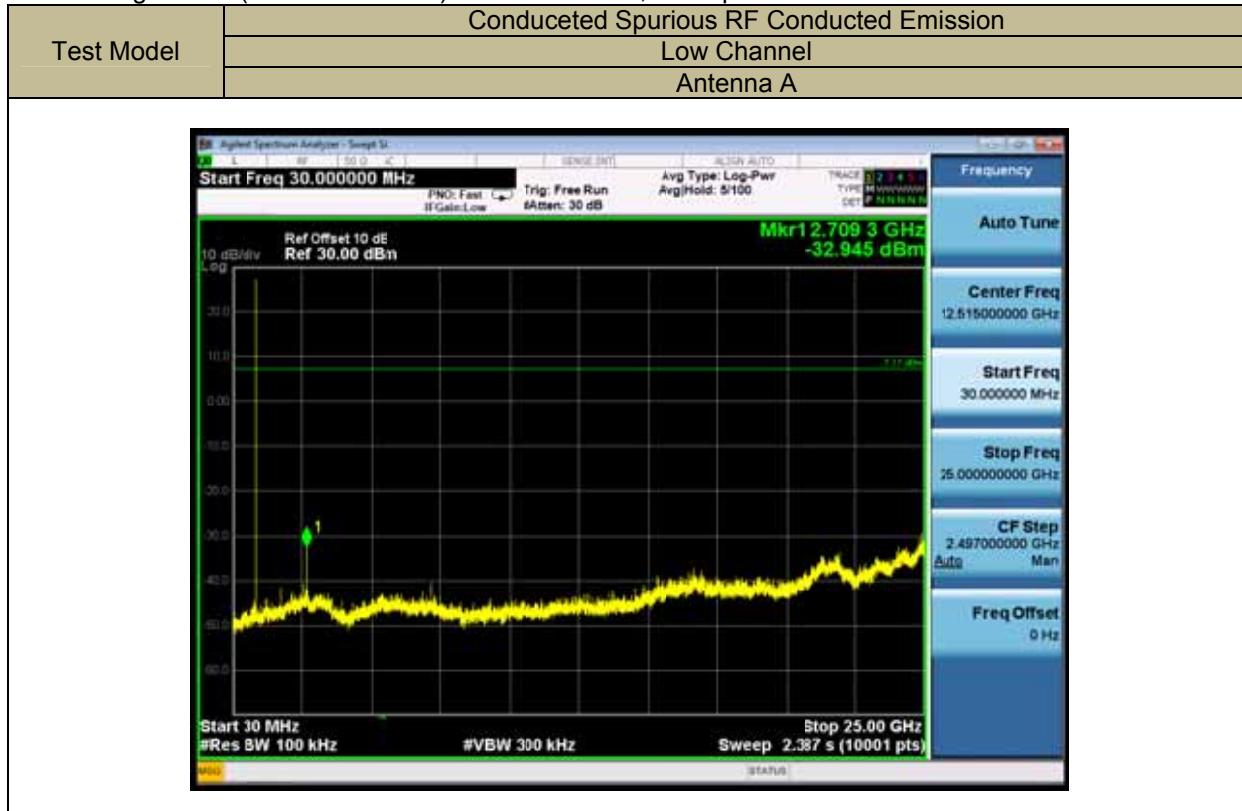
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.(30MHz to 25GHz). Set RBW = 100 kHz Set VBW  $\geq$  RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

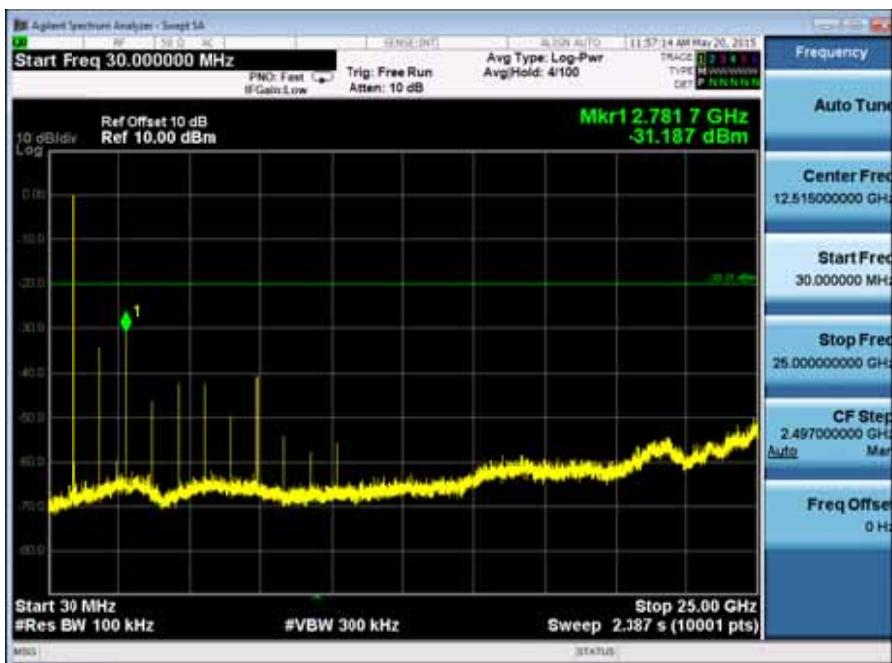
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

### 9.7.5 Test Results

All working modes (channel BW 1~9) has been tested, The report show the worst test results.



Test Model	Conducted Spurious RF Conducted Emission
	High Channel
	Antenna A
	
Test Model	Conducted Spurious RF Conducted Emission
	Low Channel
	Antenna B
	

Test Model	Conducted Spurious RF Conducted Emission							
	Mid Channel							
	Antenna B							
								
<table border="1"> <tr> <td colspan="2">Conducted Spurious RF Conducted Emission</td></tr> <tr> <td colspan="2">High Channel</td></tr> <tr> <td colspan="2">Antenna B</td></tr> </table>			Conducted Spurious RF Conducted Emission		High Channel		Antenna B	
Conducted Spurious RF Conducted Emission								
High Channel								
Antenna B								
								

## 9.8 RADIATED SPURIOUS EMISSION

### 9.8.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and DA 00-705

### 9.8.2 Conformance Limit

According to FCC Part 15.247(d): 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)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength ( $\mu$ V/m)	Field Strength ( $\text{dB}\mu$ V/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log ( $\mu$ V/m)	300
0.490-1.705	2400/F(KHz)	20 log ( $\mu$ V/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

### 9.8.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

### 9.8.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz(1GHz to 25GHz), 100 kHz for  $f < 1$  GHz(30MHz to 1GHz)

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

### 9.8.5 Test Results

All working modes (channel BW 1~9) and xyz orientation has been tested, The report show the worst test results.

■ Spurious Emission below 30MHz (9KHz to 30MHz)

Temperature:	24	Test Date:	April 30, 2015
Humidity:	53 %	Test By:	KK
Test mode:	TX Mode		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance}/\text{test distance})(\text{ dB})$ ;

Limit line=Specific limits(dBuV) + distance extrapolation factor

## ■ Spurious Emission below 1GHz (30MHz to 1GHz)

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: Low Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) QP	Limit 3m(dBuV/m) QP	Over(dB) QP
310.97	V	32.08	46	-13.92
364.32	V	35.03	46	-10.97
466.17	V	37.40	46	-8.60
368.20	H	29.56	46	-16.44
465.20	H	32.16	46	-13.84
490.42	H	33.15	46	-12.85

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: Mid Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) QP	Limit 3m(dBuV/m) QP	Over(dB) QP
128.61	V	30.56	43.5	-12.94
309.03	V	34.86	46	-11.14
421.55	V	34.15	46	-11.85
68.47	H	31.48	40	-8.52
127.64	H	32.55	43.5	-10.95
317.76	H	35.65	46	-10.35

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: High Channel

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)
	H/V	QP	QP	QP
439.98	V	30.85	46	-15.15
559.29	V	33.47	46	-12.53
692.18	V	36.13	46	-9.87
64.59	H	32.08	40	-7.92
120.85	H	34.26	43.5	-9.24
303.21	H	34.15	46	-11.85

**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: Low Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) QP	Limit 3m(dBuV/m) QP	Over(dB) QP
297.39	V	31.60	46	-14.40
554.44	V	36.85	46	-9.15
691.21	V	34.41	46	-11.59
127.64	H	26.27	46	-17.23
314.85	H	30.66	46	-15.34
424.46	H	31.05	46	-14.95

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: Mid Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) QP	Limit 3m(dBuV/m) QP	Over(dB) QP
429.31	V	33.36	46	-12.64
552.50	V	34.75	46	-11.25
692.18	V	37.10	46	-8.90
416.70	H	32.00	43.5	-14.00
548.62	H	32.95	46	-13.05
691.21	H	37.69	46	-8.31

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: High Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) QP	Limit 3m(dBuV/m) QP	Over(dB) QP
332.22	V	33.39	46	-12.61
475.78	V	36.01	46	-9.99
603.82	V	38.67	46	-7.33
353.56	H	34.62	46	-11.38
461.23	H	36.80	46	-9.20
588.30	H	36.69	46	-9.31

**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## ■ Spurious Emission Above 1GHz (1GHz to 10GHz)

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: Low Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1753.56	V	60.15	45.72	74.00	54.00	-13.85	-8.28
2925.03	V	60.35	46.14	74.00	54.00	-13.65	-7.86
5050.03	V	65.08	50.07	74.00	54.00	-8.92	-3.93
2189.46	H	61.56	48.61	74.00	54.00	-12.44	-5.39
3660.61	H	63.08	49.82	74.00	54.00	-10.92	-4.18
4341.70	H	65.38	51.00	74.00	54.00	-8.62	-3.00

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: Mid Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
3319.60	V	66.17	49.30	74.00	54.00	-7.83	-4.70
3946.20	V	65.99	48.49	74.00	54.00	-8.01	-5.51
4872.48	V	66.27	50.43	74.00	54.00	-7.73	-3.57
731.46	H	60.94	45.12	74.00	54.00	-13.06	-8.88
3592.04	H	65.87	49.36	74.00	54.00	-8.13	-4.64
4027.93	H	66.87	50.67	74.00	54.00	-7.13	-3.33

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna A Frequency: High Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
2224.13	V	61.11	45.49	74.00	54.00	-12.89	-8.51
3504.58	V	64.02	48.11	74.00	54.00	-9.98	-5.89
4894.00	V	66.87	50.77	74.00	54.00	-7.13	-3.23
3504.58	H	62.87	46.72	74.00	54.00	-11.13	-7.28
4185.67	H	65.17	48.90	74.00	54.00	-8.83	-5.10
4812.27	H	64.99	48.79	74.00	54.00	-9.01	-5.21

**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: Low Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
2408.38	V	60.74	44.23	74.00	54.00	-13.26	-9.77
3579.85	V	60.94	44.65	74.00	54.00	-13.06	-9.35
5704.85	V	65.67	48.58	74.00	54.00	-8.33	-5.42
2844.28	H	62.15	47.12	74.00	54.00	-11.85	-6.88
4315.43	H	63.67	48.33	74.00	54.00	-10.33	-5.67
4996.52	H	65.97	49.51	74.00	54.00	-8.03	-4.49

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: Mid Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
3974.42	V	66.76	47.81	74.00	54.00	-7.24	-6.19
4601.02	V	66.58	47.00	74.00	54.00	-7.42	-7.00
5527.3	V	66.86	48.94	74.00	54.00	-7.14	-5.06
1386.28	H	61.53	43.63	74.00	54.00	-12.47	-10.37
4246.86	H	66.46	47.87	74.00	54.00	-7.54	-6.13
4682.75	H	67.46	49.18	74.00	54.00	-6.54	-4.82

Temperature : 26 Test Date : April 27, 2015  
Humidity : 60 % Test By: King Kong  
Antenna B Frequency: High Channel

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
2878.95	V	61.70	44.00	74.00	54.00	-12.30	-10.00
4159.4	V	64.61	46.62	74.00	54.00	-9.39	-7.38
5548.82	V	67.46	49.28	74.00	54.00	-6.54	-4.72
4159.4	H	63.46	45.23	74.00	54.00	-10.54	-8.77
4840.49	H	65.76	47.41	74.00	54.00	-8.24	-6.59
5467.09	H	65.58	47.30	74.00	54.00	-8.42	-6.70

**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## **9.9 CONDUCTED EMISSIONS TEST**

### **9.9.1 Applicable Standard**

According to FCC Part 15.207(a)

### **9.9.2 Conformance Limit**

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies  
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

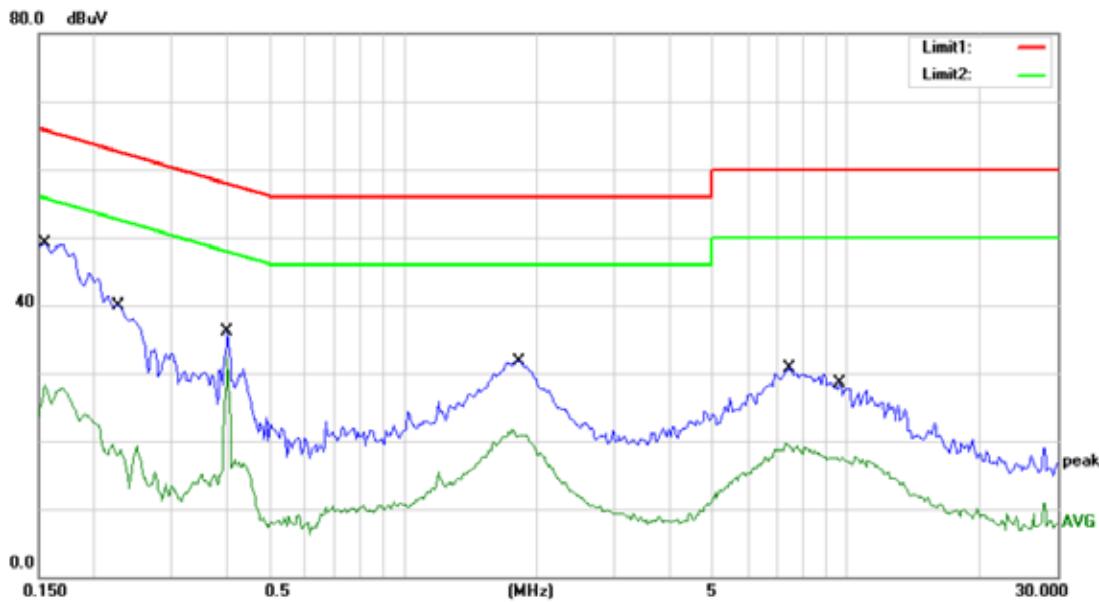
### **9.9.3 Test Configuration**

Test according to clause 7.3 conducted emission test setup

### **9.9.4 Test Procedure**

The EUT was placed on a table which is 0.8m above ground plane.  
Maximum procedure was performed on the highest emissions to ensure EUT compliance.  
Repeat above procedures until all frequency measured were complete.

### **9.9.5 Test Results**



Site Conduction #1

Limit: (CE)FCC PART 15 C

Mode: ON

Note:

Phase: **L1**

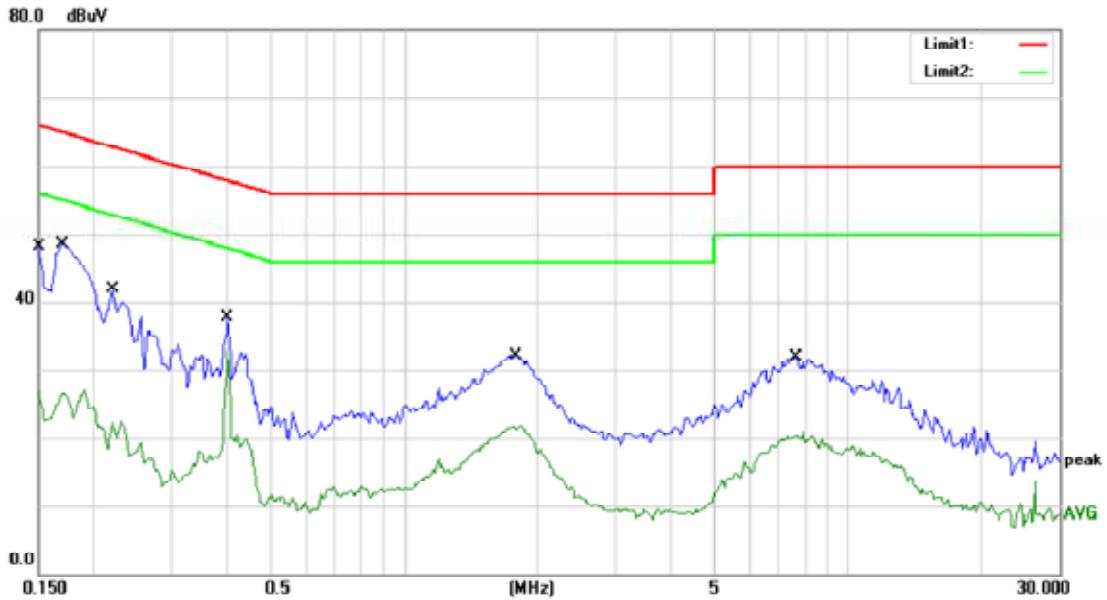
Power: AC 120V/60Hz

Temperature: 24

Humidity: 53 %

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1550	49.08	0.00	49.08	65.73	-16.65	QP	
2		0.1550	28.38	0.00	28.38	55.73	-27.35	AVG	
3		0.2303	39.61	0.00	39.61	62.44	-22.83	QP	
4		0.2303	19.23	0.00	19.23	52.44	-33.21	AVG	
5		0.4000	36.02	0.00	36.02	57.85	-21.83	QP	
6	*	0.4000	32.24	0.00	32.24	47.85	-15.61	AVG	
7		1.8250	31.78	0.00	31.78	56.00	-24.22	QP	
8		1.8250	20.99	0.00	20.99	46.00	-25.01	AVG	
9		7.4700	30.80	0.00	30.80	60.00	-29.20	QP	
10		7.4700	19.69	0.00	19.69	50.00	-30.31	AVG	
11		9.6800	28.53	0.00	28.53	60.00	-31.47	QP	
12		9.6800	17.63	0.00	17.63	50.00	-32.37	AVG	

\*:Maximum data   x:Over limit   !:over margin   Comment: Factor build in receiver.   Operator: GUAN



Site Conduction #1

Phase: **N**

Temperature: 24

Limit: (CE)FCC PART 15 C

Power: AC 120V/60Hz

Humidity: 53 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1500	48.06	0.00	48.06	66.00	-17.94	QP	
2		0.1500	26.81	0.00	26.81	56.00	-29.19	AVG	
3		0.1700	48.60	0.00	48.60	64.96	-16.36	QP	
4		0.1700	26.58	0.00	26.58	54.96	-28.38	AVG	
5		0.2200	41.85	0.00	41.85	62.82	-20.97	QP	
6		0.2200	22.57	0.00	22.57	52.82	-30.25	AVG	
7		0.4000	37.73	0.00	37.73	57.85	-20.12	QP	
8	*	0.4000	32.95	0.00	32.95	47.85	-14.90	AVG	
9		1.7900	32.13	0.00	32.13	56.00	-23.87	QP	
10		1.7900	21.95	0.00	21.95	46.00	-24.05	AVG	
11		7.6500	31.95	0.00	31.95	60.00	-28.05	QP	
12		7.6500	20.90	0.00	20.90	50.00	-29.10	AVG	

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: GUAN

## 9.10 ANTENNA APPLICATION

### 9.10.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### Result

The EUT has two antenna, The antenna A is a Dipole antenna(The antenna is connected via an reverse polarity SMA type connection), The antenna B is a Matel antenna or Spiral antenna, and these antenna can't be replaced by the user which in accordance to section 15.203, please refer to the photos.

### 9.10.2 Result

PASS.