

Wireless Pull station

Model No.: NBG-12WL

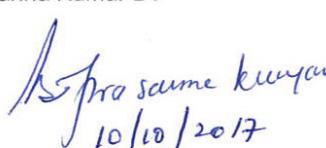
Date: 10-Oct-2017

Report Prepared By:
Magesh.S

EMC Test Report

(This is an Amended Report for Report No. EMC0208-1)

Report Number	EMC0208-1_amd1
EUT Nomenclature	Wireless Pull Station
Sample Identification	Model No : NBG-12WL SL. No : PS2-06 Software Version : 5.88 Hardware Version : Rev 2
Number of Samples	1
Date of receipt of Sample	10-Mar-2017
Condition of Sample on receipt	Good
Client name	Honeywell International Inc
Client Address	System Sensor, 3825, Ohio Ave, St. Charles , IL, USA - 60174
Testing Laboratory	Honeywell Technology Solutions Lab Pvt Ltd
Address	RMZ ECOWORLD INFRASTRUCTURE PVT Ltd, (Formerly Adarsh Prime Projects Pvt Ltd.,SEZ) Survey # 19/2,Devarabisanahalli Village, Varthur Hobli, Bangalore East Taluk ,Bangalore -560103
Test Dates	16-Mar-2017 to 07-Jun-2017
Applicable Standard	FCC Part 15:2010, ANSI C63.10:2013
Test Results	PASS

Prepared By: Test Engineer Name : Magesh.S Signature:  Date : 10/10/2017	Reviewed & Authorized By: Technical Manager Name : Prasanna Kumar BT Signature:  Date : 10/10/2017
This Report relates to the above mentioned test sample only. Without the approval of Lab manager, this report shall not be reproduced except in full.	

Amendment Details		
Date	Changes made	Page Reference
10-Oct-2017	Model no of the product is changed from "NBG-12LW" to "NBG-12WL"	1, 2, 8, 11, 17, 47, 53, 57, 60, 65, 76, 103, 108, 119, 124, 127 and 148

TEST SUMMARY					
#	Name	Specification	Test Method	Pass	Fail
FHSS					
1	20dB Bandwidth	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Maximum Peak Output Power	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Carrier Frequency Separation	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Number of Hopping Frequencies	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Band Edge compliance	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Time of Occupancy (Dwell Time)	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Spurious RF Conducted Emissions	FCC Part 15.247 :2010	DA 00-705	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Effective Isotropic Radiated Power	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 412172	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Spurious Radiated Emissions	FCC Part 15.247 : 2010 and 15.209 : 2010	DA 00-705 ANSI C63.10 - 2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DTS					
1	DTS 6dB Bandwidth	FCC Part 15.247: 2010	KDB 558074	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Maximum Peak Output Power	FCC Part 15.247: 2010	KDB 558074	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Maximum Power Spectral Density	FCC Part 15.247: 2010	KDB 558074	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Band Edge Conducted Emissions	FCC Part 15.247: 2010	KDB 558074	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Effective Isotropic Radiated Power	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 412172	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Spurious Radiated Emissions	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 558074 ANSI C63.10 - 2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NA- Not Applicable					

MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR 16-4

The Expanded measurement uncertainty (K=2) is provided below

#	Name	Value
1	20dB & 6dB Occupied Bandwidth	1.08dB
2	Maximum Peak Output Power Level & Band Edge Conducted Emission	1.37dB
3	Power Spectral Density	1.36dB
4	Spurious RF Conducted Emission	1.40dB
5	Radiated Spurious Emission < 1GHz	4.90dB
6	Radiated Spurious Emission > 1GHz	6.05dB

1 PRODUCT DETAILS

PRODUCT OPERATION AND INTENDED USE

The Wireless Pull Station is powered by four CR123A batteries. The module has an LED to indicate the activation and trouble status. The Pull Station will occupy one module address.

RATINGS AND SYSTEM DETAILS

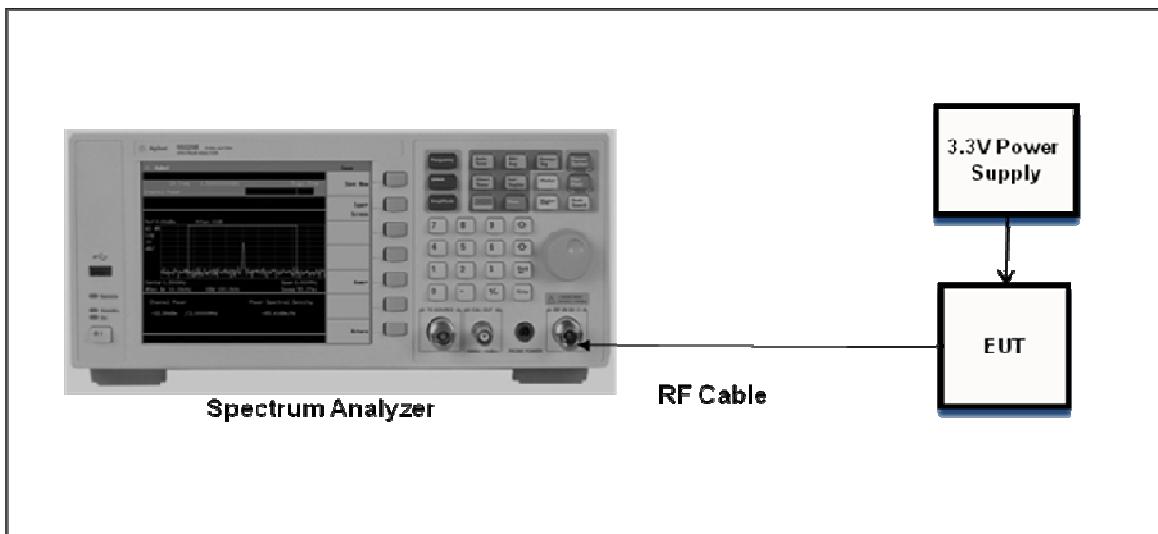
Operating Frequency	902MHz to 928MHz
Number of Channels	DTS : 6 FHSS : 55
Channel Bandwidth (20dB)	DTS : 1MHz FHSS : 320KHz
Transmitted Power	DTS : 12dBm FHSS : 17dBm
Modulation Type	FSK
Data Rate	DTS : 300Kbps FHSS : 150Kbps
Antenna Type	Inverted F Patch Antenna
No. of Antenna	3
Antenna Gain	ANT 1 : 1.75dBi ANT 2 : 0.08dBi ANT 3 : 1.9dBi
Supply Voltage and Current	3.3V, 5mA
Dimensions (L x B x H)	10.72cm x 3.66cm x 14.62cm
Environmental Conditions	Operating Temperature :0 °C to 49 °C Storage Temperature : -10 °C to 60 °C Humidity :10% to 93% RH

TEST CONFIGURATION	
Config #	Description
Conducted Test	EUT is Powered by external 3.3V power supply. EUT Debug port (UART) is connected to Laptop through USB to UART converter cable. EUT is configured to the respective operating mode through HyperTerminal. Test is performed at Antenna 3 as this is the high gain antenna
Radiated Test	EUT is Powered from Battery. EUT Debug port (UART) is connected to Laptop through USB to UART converter cable. EUT is configured to the respective operating mode through HyperTerminal. Test is performed at all 3 Antennas

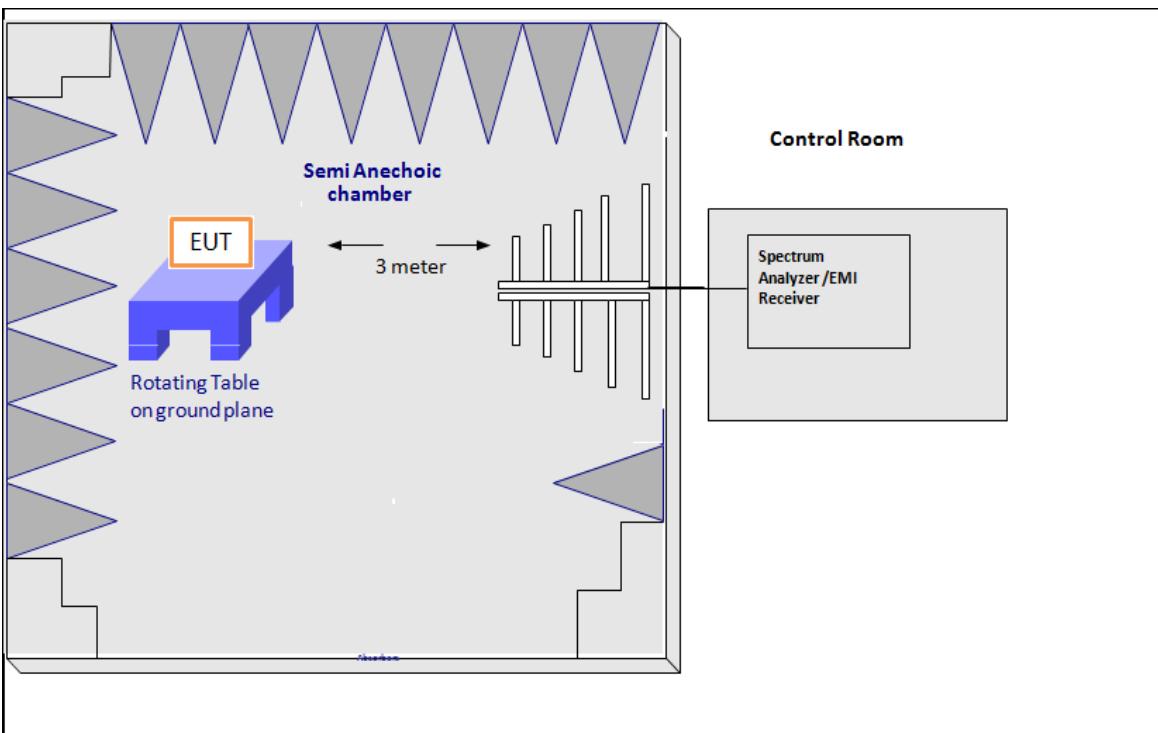
OPERATING MODES	
Mode #	Description
DTS	Following DTS channels have been used for Conducted (Continuous Transmission) and Radiated (Continuous Transmission) Tests Channel 1 : 902.875MHz Channel 2 : 908.425MHz Channel 3 : 914.325MHz Channel 4 : 915.325MHz Channel 5 : 921.575MHz Channel 6 : 927.125MHz
FHSS	Following FHSS channels have been used for Conducted (Continuous Transmission) and Radiated (Continuous Transmission) Tests Channel 1 : 903.55MHz Channel 28 : 916.00MHz Channel 55 : 926.45MHz

SUPPORT EQUIPMENTS AND ACCESSORIES USED					
#	Item Description	Make	Model	Part No. / Sl. No	Cal Due Date
1	Laptop	DELL	E5440	35812093358	NA
2	USB to UART Cable	FTDI	TTL-232R-3V3	NA	NA

INPUT AND OUTPUT CABLES					
Port #	Name	Port Type	Cable Length	Cable type Shielded/ Unshielded	Comments
	NA				
*Note :	AC	= AC Power Port		DC	= DC Power Port
	TP	= Telecommunication Ports (E.g. Ethernet)		DI / DO	= Digital Input / Output
	N / E	= Non Electrical		AI / AO	= Analog Input / Output

CONNECTION DIAGRAM AND SETUP DIAGRAM

Conducted RF Test Setup



Radiated Emission Test Setup

2 FHSS CHANNELS

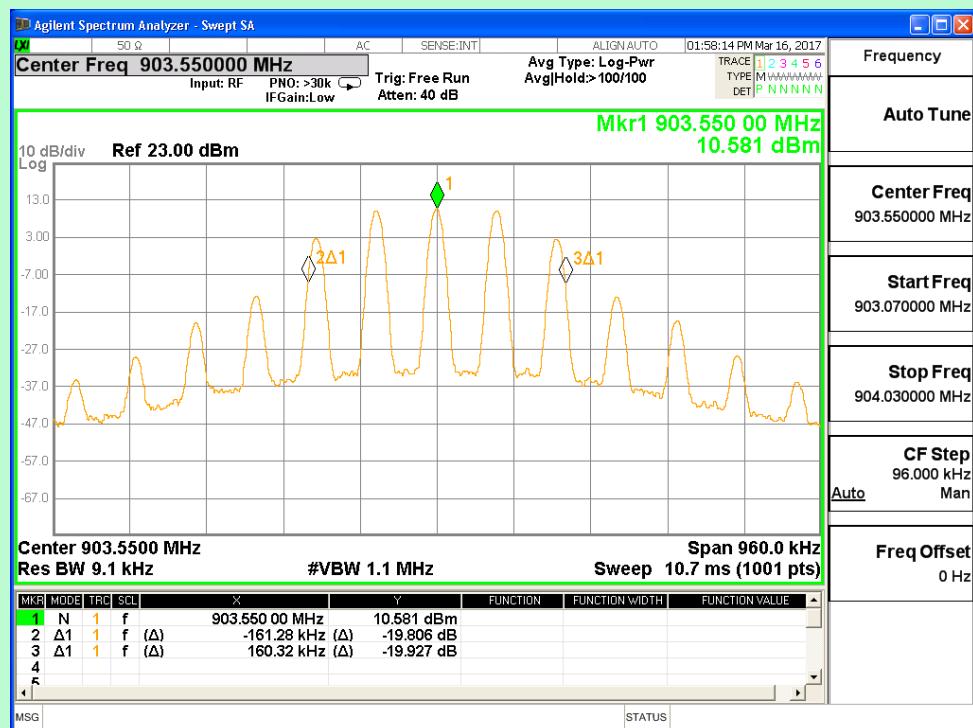
2.1 20dB BANDWIDTH

EUT Nomenclature	Wireless Pull Station	Test Request No.	EMC0208-1
Model No.	NBG-12WL	Serial No.	PS2-06
Test Start Date	16-Mar-2017	Temperature (°C)	23.6°C
Test End Date	16-Mar-2017	Humidity RH (%)	51.9%RH
Tested By	Sasikala	Pressure (mbar)	NR
Input Voltage / Freq.	3.3Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		
TEST DETAILS			
Method	Radiated <input type="checkbox"/>	Conducted <input checked="" type="checkbox"/>	
TEST PARAMETERS			
Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement	NA

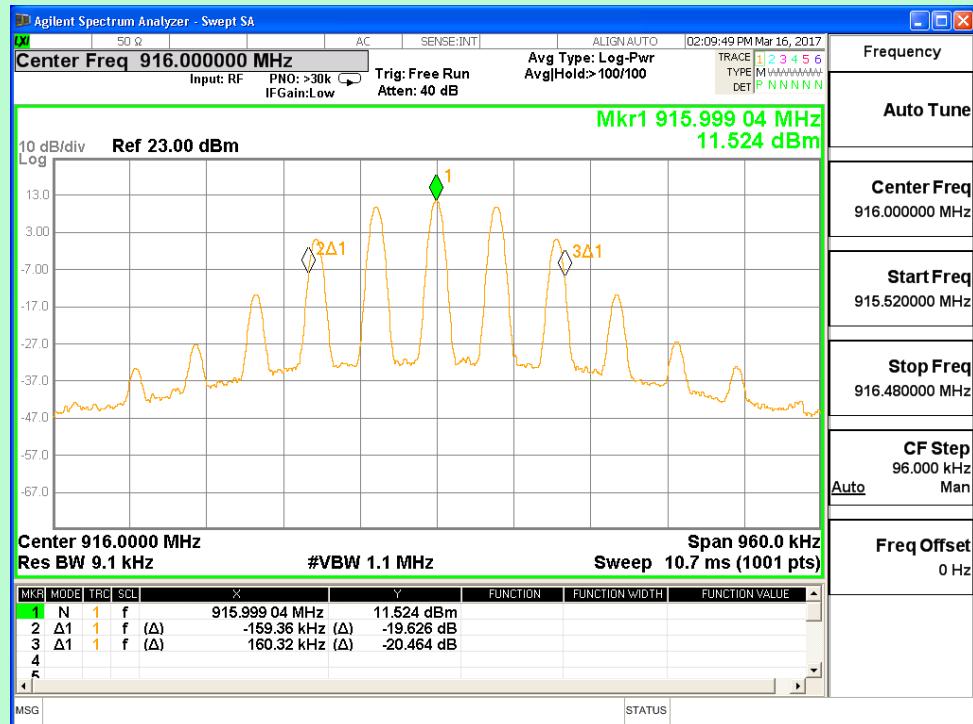
TEST EQUIPMENT

Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	N9010A	MY48031005	22-Feb-2018
Y	RF Cable	Huber- Suhner	SF104/2X11PC3542/500	NA	NA

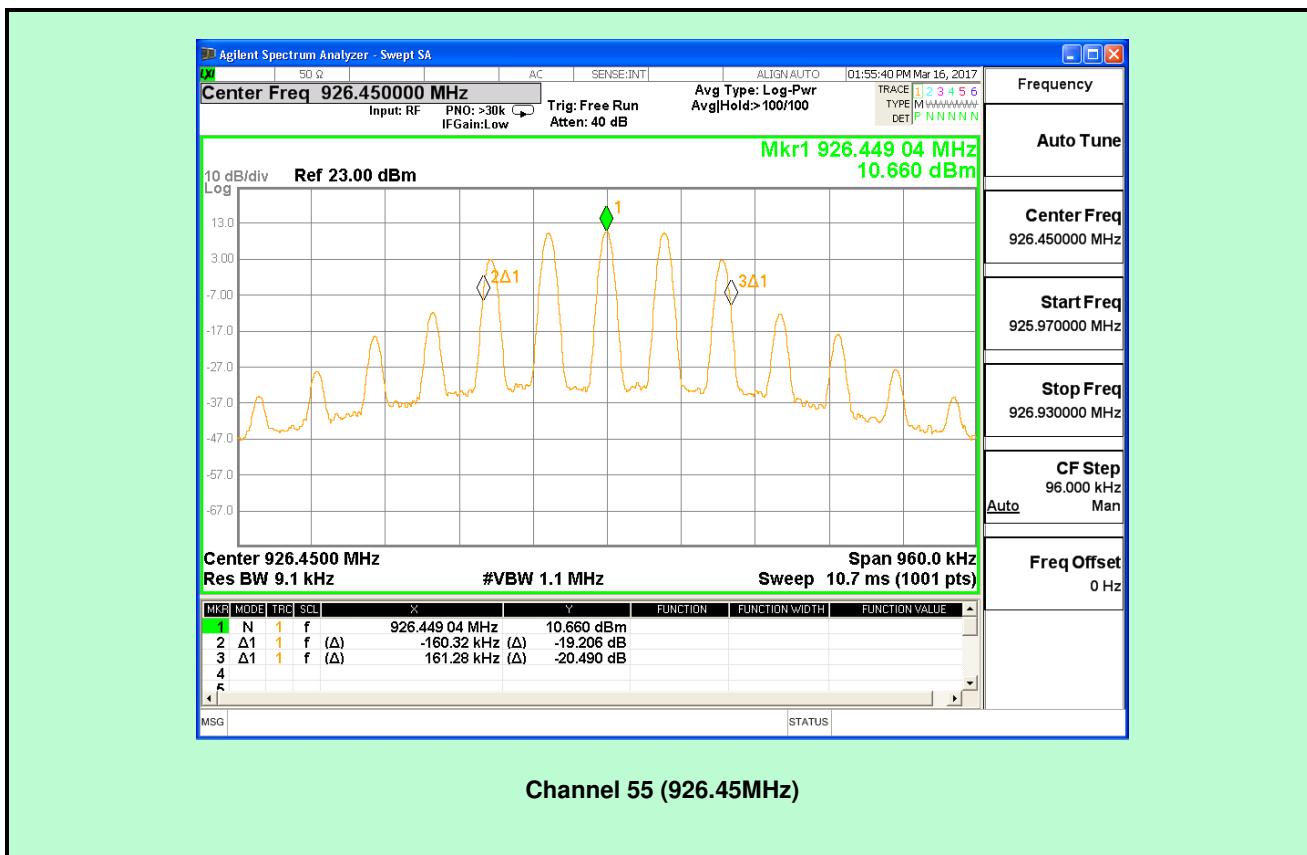
TEST GRAPHS



Channel 1 (903.55MHz)



Channel 28 (916MHz)



TEST RESULT					
Channel	Frequency	Measured Bandwidth	Limit	Result	
#	MHz	KHz	KHz		
1	903.55	321.6	≥250 & ≤500	Pass	
28	916	319.68	≥250 & ≤500		
55	926.45	321.6	≥250 & ≤500		

TEST SETUP PHOTOGRAPH

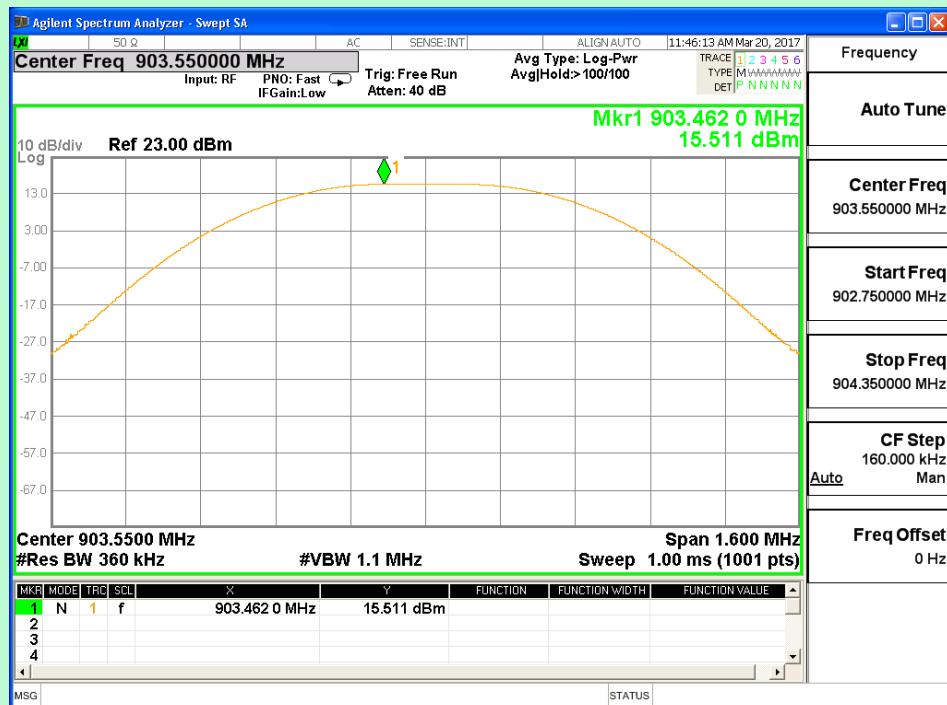
Refer Annexure -1

Conducted RF Test setup

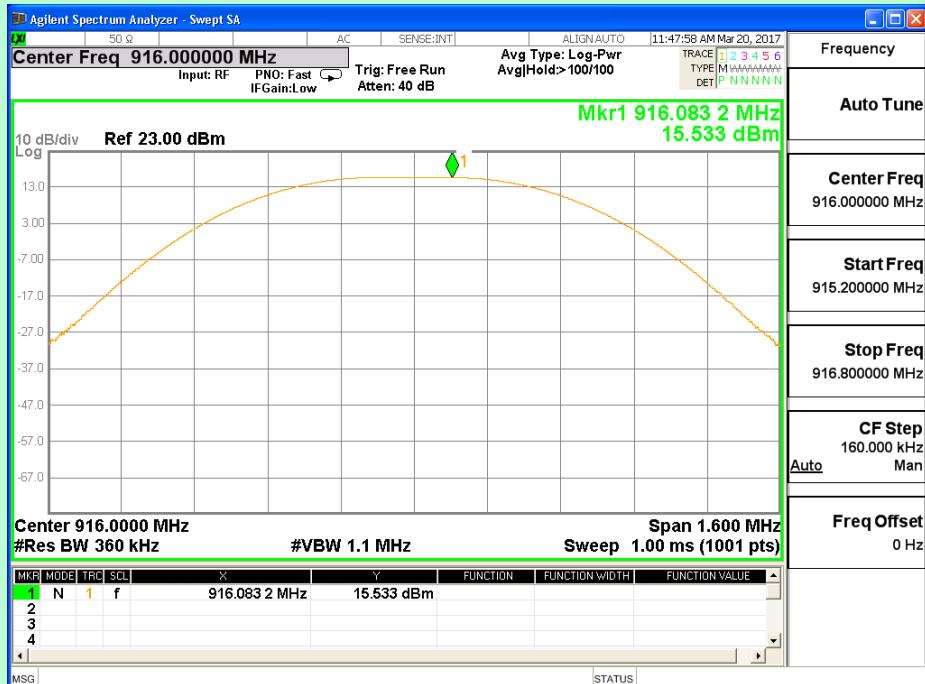
2.2 PEAK OUTPUT POWER			
EUT Nomenclature	Wireless Pull Station	Test Request No.	EMC0208-1
Model No.	NBG-12WL	Serial No.	PS2-06
Test Start Date	15-Mar-2017	Temperature (°C)	23.6°C ± 2
Test End Date	20-Mar-2017	Humidity RH (%)	51.9%RH ± 2
Tested By	Sasikala	Pressure (mbar)	NR
Input Voltage / Freq.	3.3Vdc		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std.	NA		
Applicable standard	FCC Part 15.247:2010		
Test Method	DA 00-705		
Comment	NA		
TEST DETAILS			
Method	Radiated <input type="checkbox"/>	Conducted <input checked="" type="checkbox"/>	
TEST PARAMETERS			
Antenna Height	NA	Turntable Rotation	NA
Equipment Class	NA	Measurement	NA

TEST EQUIPMENT					
Y/N	Equipment	Make	Model	Serial Number	Cal Due Date
Y	Spectrum Analyzer	Agilent	N9010A	MY48031005	22-Feb-2018
Y	RF Cable	Huber- Suhner	SF104/2X11PC3542/500	NA	NA

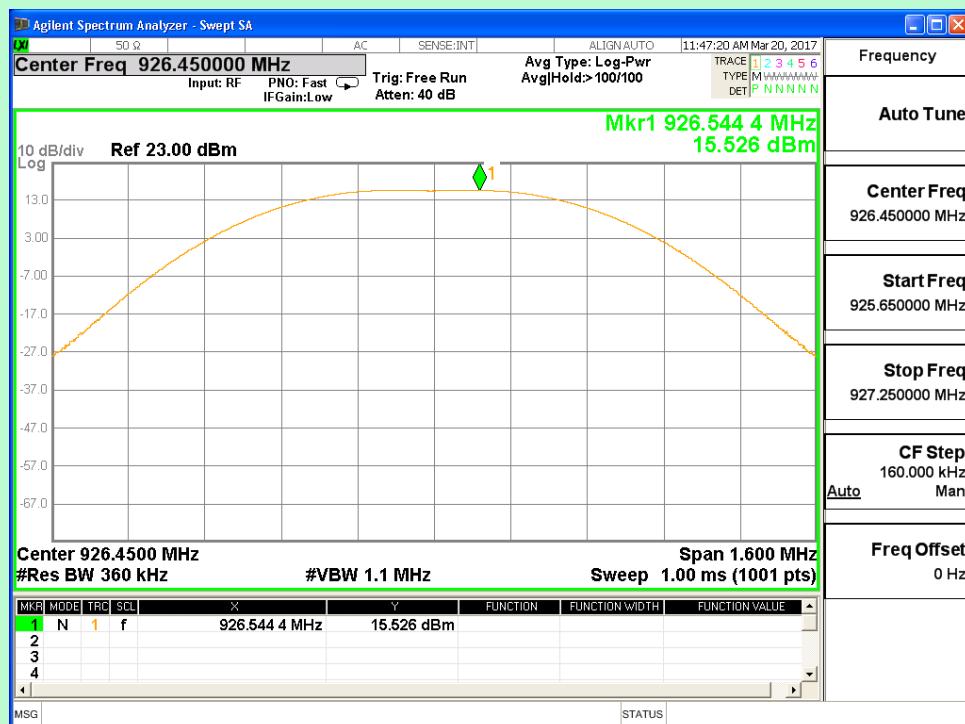
TEST GRAPHS



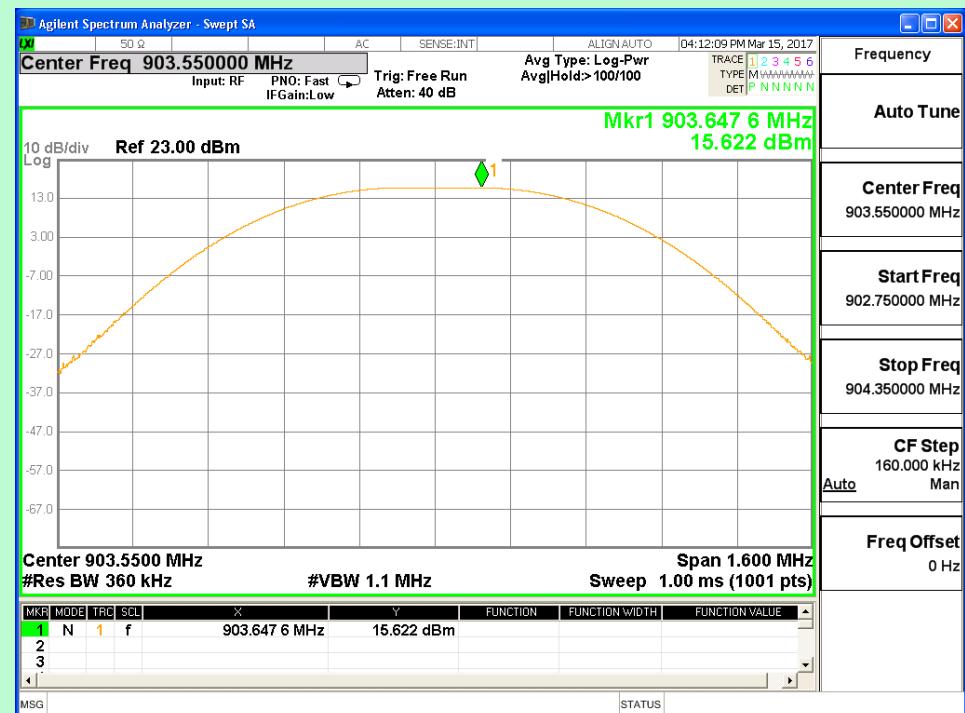
Antenna 1- Channel 1 (903.55MHz)



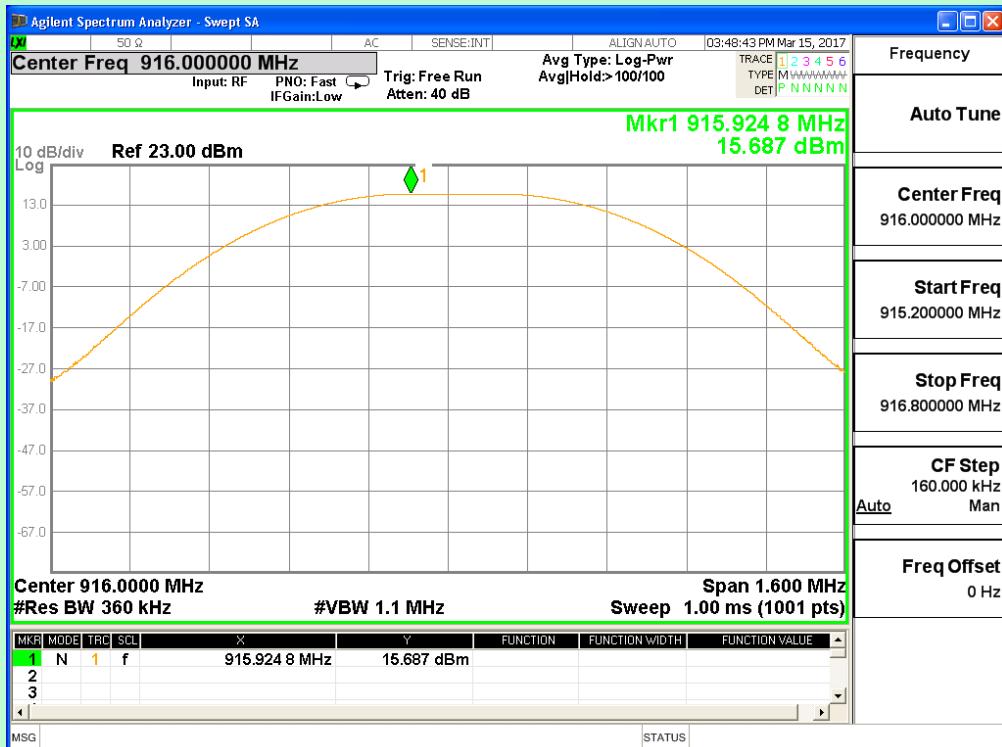
Antenna 1- Channel 28 (916MHz)



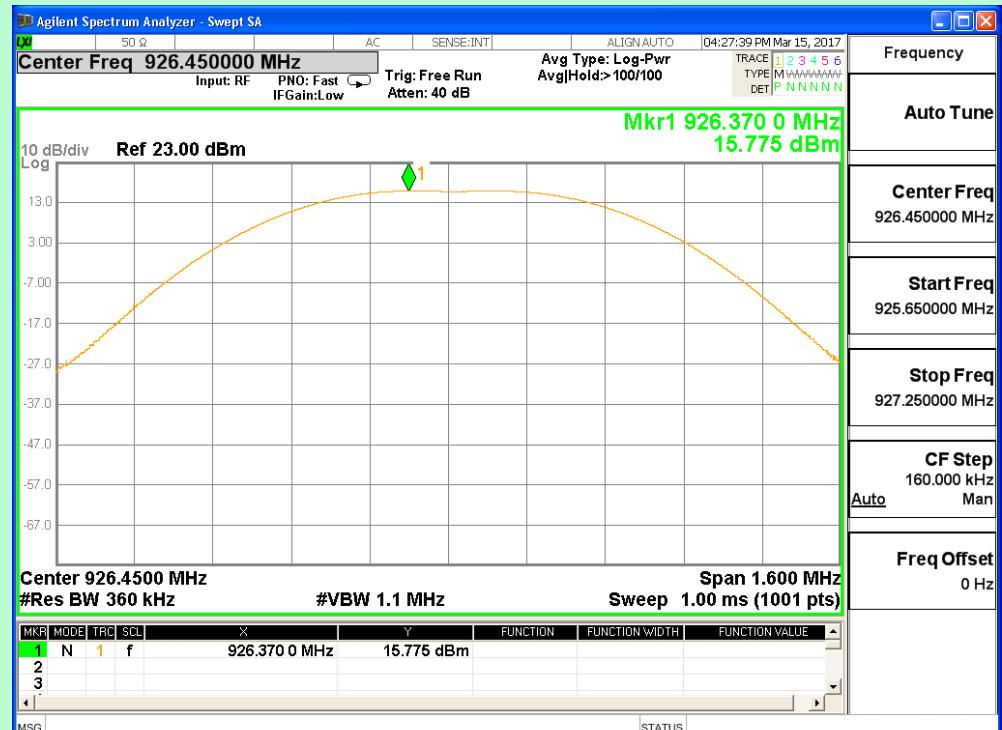
Antenna 1-Channel 55 (926.45MHz)



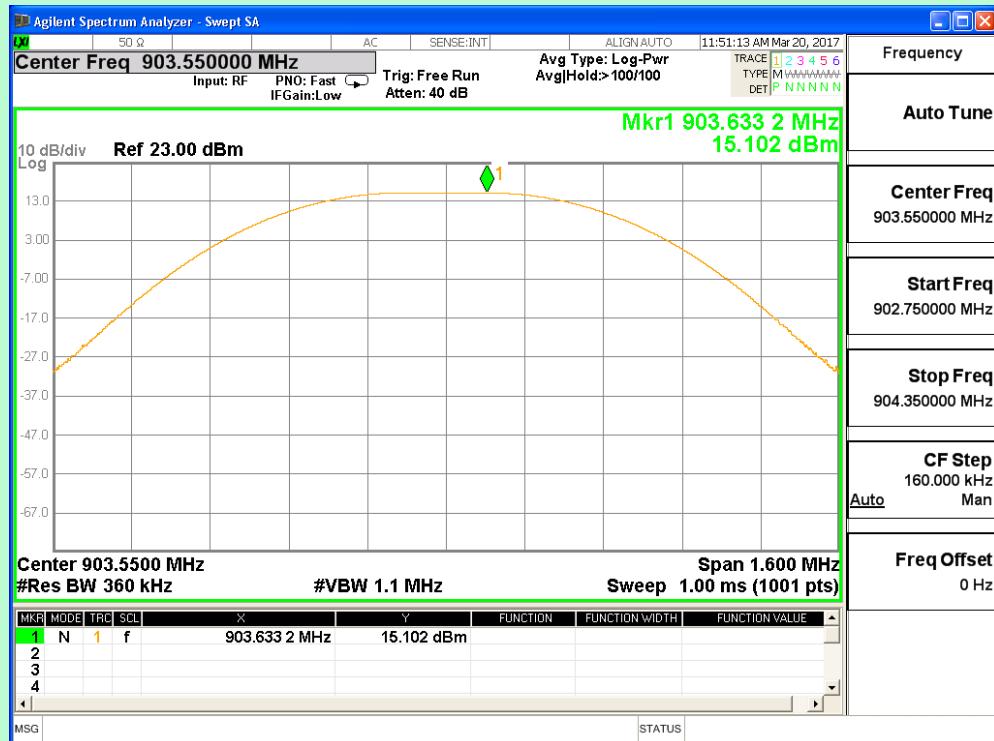
Antenna 2- Channel 1 (903.55MHz)



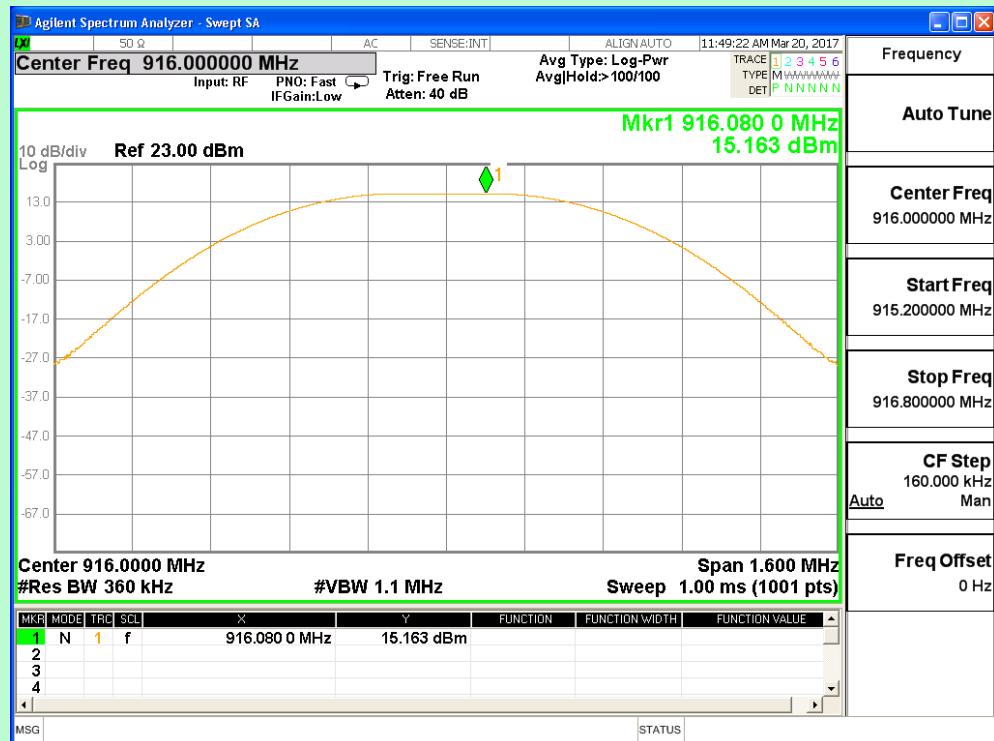
Antenna 2- Channel 28 (916MHz)



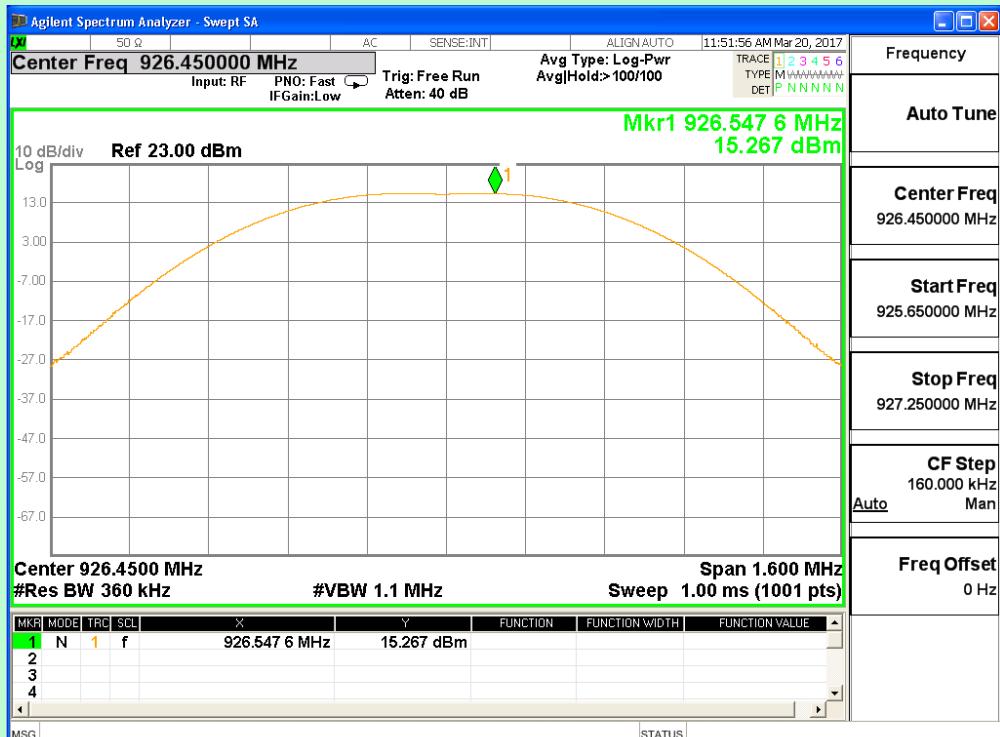
Antenna 2-Channel 55 (926.45MHz)



Antenna 3- Channel 1 (903.55MHz)



Antenna 3- Channel 28 (916MHz)



Antenna 3-Channel 55 (926.45MHz)

TEST RESULT

Channel	Frequency	Measured Power Level	Cable Loss	Transmitter Power Level	Limit	Result
#	MHz	dBm	dB	dBm	dBm	
Antenna 1						
1	903.55	15.5	0.9	16.4	<=23.979	PASS
28	916.00	15.5	0.9	16.4	<=23.979	PASS
55	926.45	15.5	0.9	16.4	<=23.979	PASS
Antenna 2						
1	903.55	15.62	0.9	16.52	<=23.979	PASS
28	916.00	15.68	0.9	16.58	<=23.979	PASS
55	926.45	15.77	0.9	16.67	<=23.979	PASS
Antenna 3						
1	903.55	15.09	0.9	15.99	<=23.979	PASS
28	916.00	15.16	0.9	16.06	<=23.979	PASS
55	926.45	15.26	0.9	16.16	<=23.979	PASS

Note: Transmitter Output Power = Measured Level (dBm) + Cable Loss (dB)

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup