Wireless AV Base

EMC Test Report

Model No.: WAV-RL

Date: 25-Sep-2017

Report Prepared By:

Magesh.S

Report Number	EMC0209-1
EUT Nomenclature	Wireless AV Base
Sample Identification	Model No : WAV-RL SL. No : AV-RF202 Software Version : 5.88. Hardware Version : Rev 2
Number of Samples	1
Date of receipt of Sample	28-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	21-April-2017 to 06-June-2017
Applicable Standard	FCC Part 15:2010,ANSI C63.10:2013
Test Results	PASS

Prepared By: Test Engineer Name : Magesh.S Signature: Date : 25/09/2017	Reviewed & Authorized By: Technical Manager Name : Prasanna Kumar BT Signature: Date : 25/9/2017

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.

TEST SUMMARY					
#	Name	Specification	Test Method	Pass	Fail
		FHSS			
1	20dB Bandwidth	FCC Part 15.247 :2010	DA 00-705	☒	☐
2	Maximum Peak Output Power	FCC Part 15.247 :2010	DA 00-705	☒	☐
3	Carrier Frequency Separation	FCC Part 15.247 :2010	DA 00-705	☒	☐
4	Number of Hopping Frequencies	FCC Part 15.247 :2010	DA 00-705	☒	☐
5	Band Edge compliance	FCC Part 15.247 :2010	DA 00-705	☒	☐
6	Time of Occupancy (Dwell Time)	FCC Part 15.247 :2010	DA 00-705	☒	☐
7	Spurious RF Conducted Emissions	FCC Part 15.247 :2010	DA 00-705	☒	☐
8	Effective Isotropic Radiated Power	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 412172	☒	☐
9	Spurious Radiated Emissions	FCC Part 15.247 : 2010 and 15.209 : 2010	DA 00-705 ANSI C63.10 - 2013	☒	☐
		DTS			
1	DTS 6dB Bandwidth	FCC Part 15.247: 2010	KDB 558074	☒	☐
2	Maximum Peak Output Power	FCC Part 15.247: 2010	KDB 558074	☒	☐
3	Maximum Power Spectral Density	FCC Part 15.247: 2010	KDB 558074	☒	☐
4	Band Edge Conducted Emissions	FCC Part 15.247: 2010	KDB 558074	☒	☐
5	Effective Isotropic Radiated Power	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 412172	☒	☐
6	Spurious Radiated Emissions	FCC Part 15.247 : 2010 and 15.209 : 2010	KDB 558074 ANSI C63.10 - 2013	☒	☐

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	1.4dB
5	Radiated Spurious Emission < 1GHz	4.9dB
6	Radiated Spurious Emission > 1GHz	6.05dB

1 PRODUCT DETAILS

PRODUCT OPERATION AND INTENDED USE

The wireless AV base is powered by eight CR123A batteries. Four of the CR123A batteries are used to power the notification element and four of the CR123A batteries are used to power the radio communication element. The module has an LED to indicate the activation and trouble status.

The module is compatible for wall or ceiling System Sensor L-series notification device

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 :3.93dBi ANT 2 :3.06dBi ANT 3 :2.81dBi
Supply Voltage and Current	3.3V, 22mA
Dimensions (Length x Width x Height)	13 cm x 4 cm x 15cm
Environmental Conditions	Operating Temperature :0℃ to 49℃
	Storage Temperature : -10℃ to 60℃
	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 1 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 Hyper Terminal. 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

INPUT AND OUTPUT CABLES

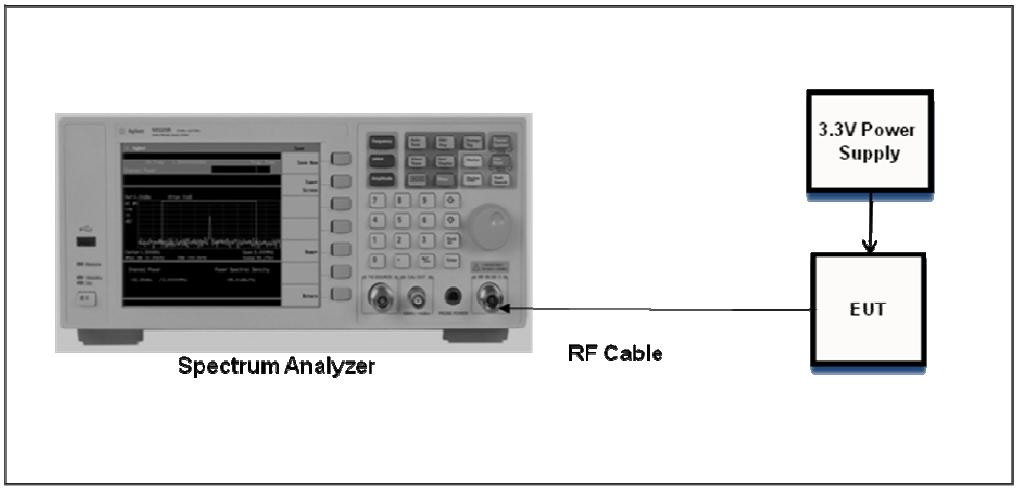
Port #	Name	Port Type	Cable Length	Cable type Shielded/ Unshielded	Comments
	Nil				**nil**

*Note : AC = AC Power Port; TP = Telecommunication Ports (E.g. Ethernet); N /E = Non Electrical; DC = DC Power Port; DI / DO = Digital Input / Output; AI / AO = Analog Input / Output

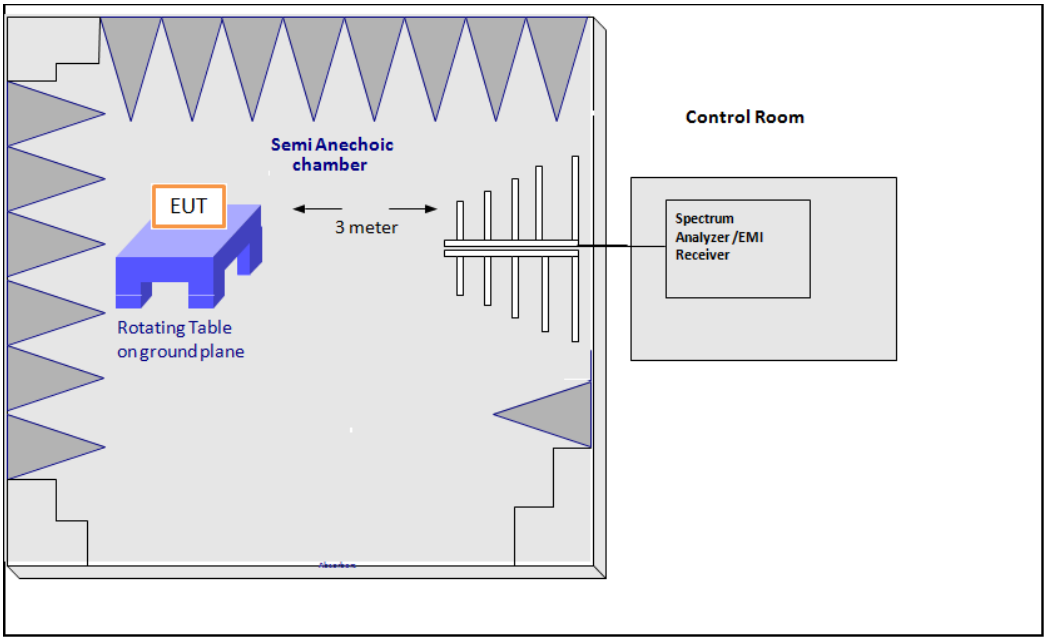
SUPPORT EQUIPMENTS AND ACCESSORIES USED

#	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

CONNECTION DIAGRAM AND SETUP DIAGRAM



Conducted RF Test Setup



Radiated Emission Test Setup

2 FHSS CHANNELS

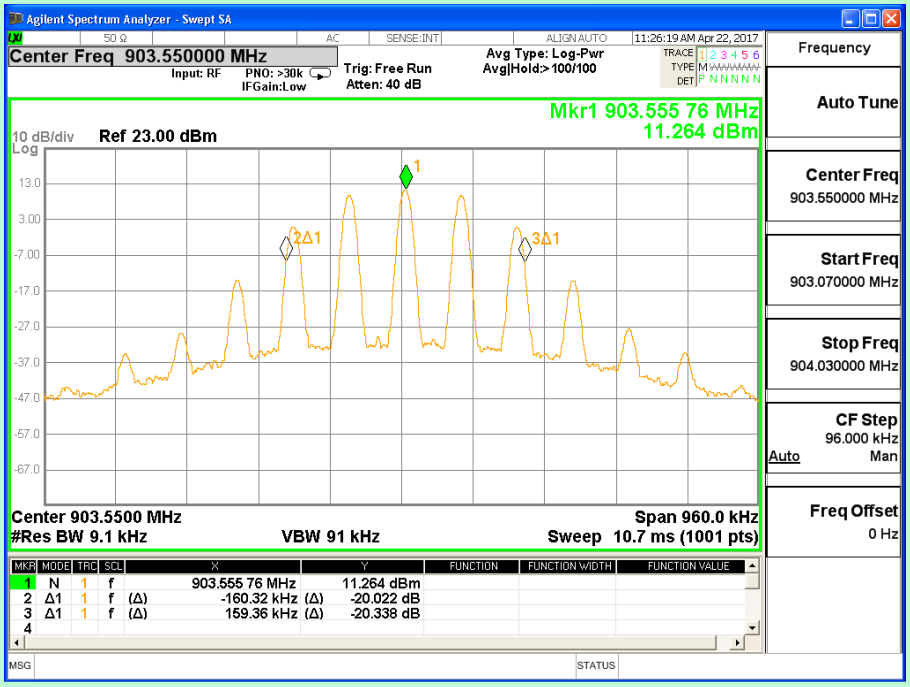
2.1 20dB BANDWIDTH			
EUT Nomenclature	Wireless AV Base	**Test Request No.**	EMC0209-1
Model No.	WAV-RL	**Serial No.**	AV-RF202
Test Start Date	22-Apr-2017	**Temperature (˚C)**	23.6℃
Test End Date	22-Apr-2017	**Humidity RH (%)**	51.9%RH
Tested By	Sasikala	**Pressure (mbar)**	NR
Input Voltage / Freq.	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 ☐	Conducted ☒

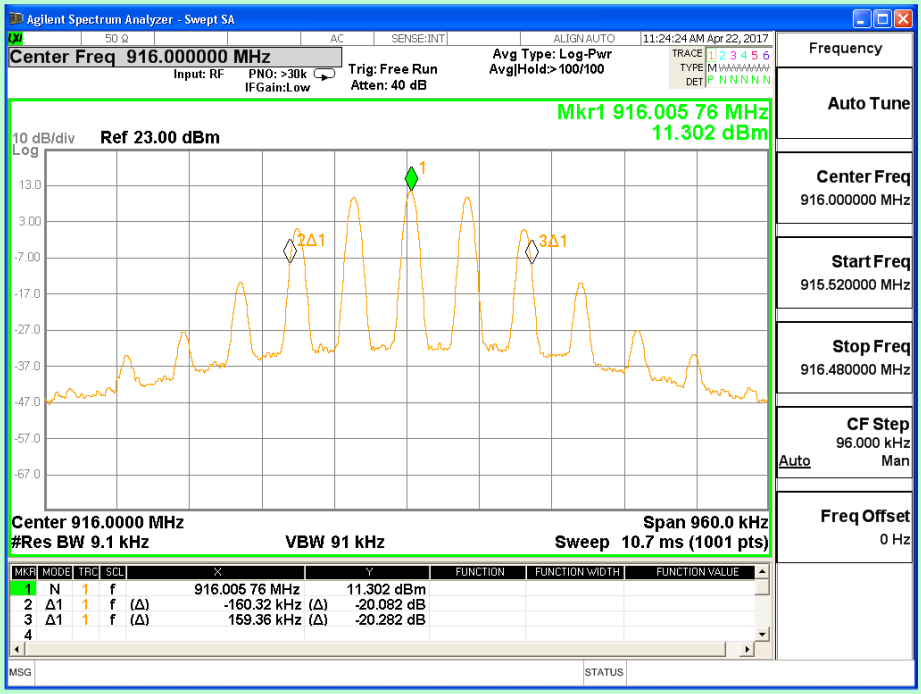
TEST PARAMETERS			
Antenna Height	NA	**Turntable Rotation**	NA
Equipment Class	NA	**Measurement Distance**	NA

TEST EQUIPMENT					
Y/N	**Equipment**	**Make**	**Model**	**Sl. No.**	**Cal Due Date**
Y	Spectrum Analyzer	Agilent	N9010A	MY48031005	22-Feb-2018
Y	RF Cable	Huber- Suhner	SF104/2X11PC3542/500	NA	NA

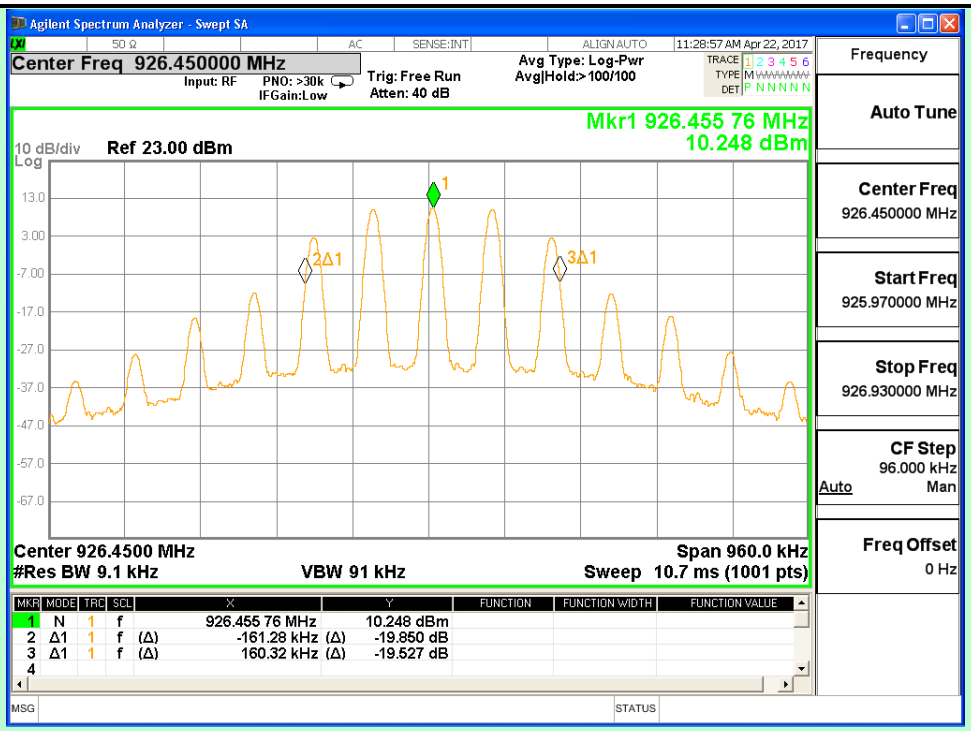
TEST GRAPHS



Channel 1 (903.55MHz)



Channel 28 (916MHz)



Channel 55 (926.45MHz)

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

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup

2.2 MAXIMUM PEAK OUTPUT POWER LEVEL

EUT Nomenclature	Wireless AV Base	**Test Request No.**	EMC0209-1
Model No.	WAV-RL	**Serial No.**	AV-RF202
Test Start Date	21-Apr-2017	**Temperature (˚C)**	23.6℃
Test End Date	22-Apr-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		

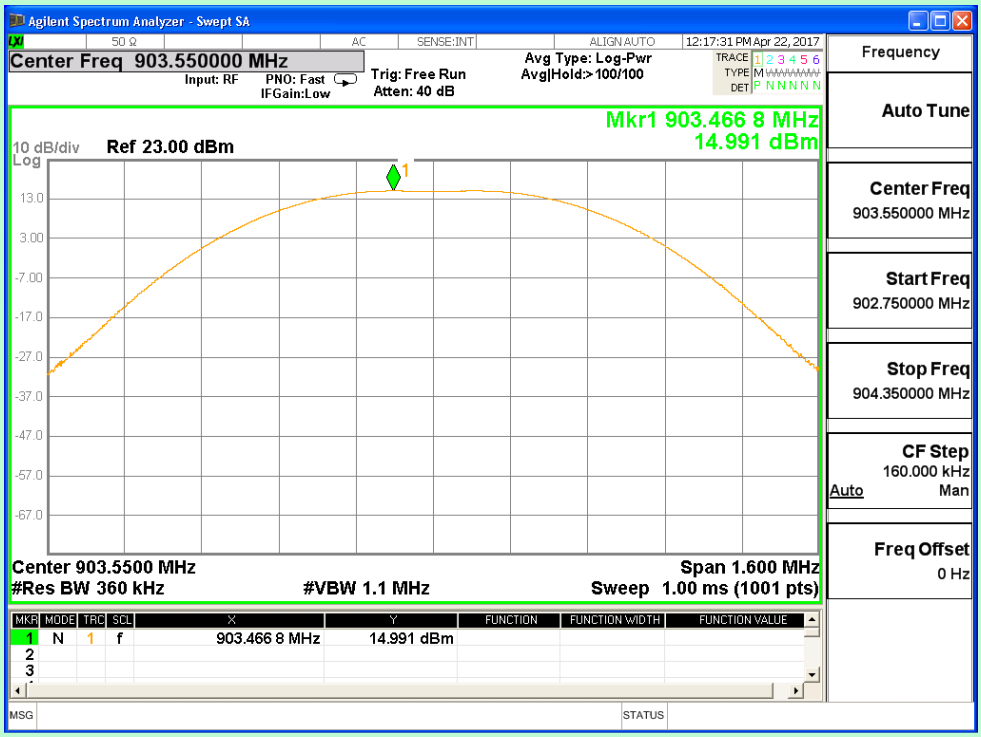
TEST DETAILS		
Method	Radiated ☐	Conducted ☒

TEST PARAMETERS			
Antenna Height	NA	**Turntable Rotation**	NA
Equipment Class	NA	**Measurement Distance**	NA

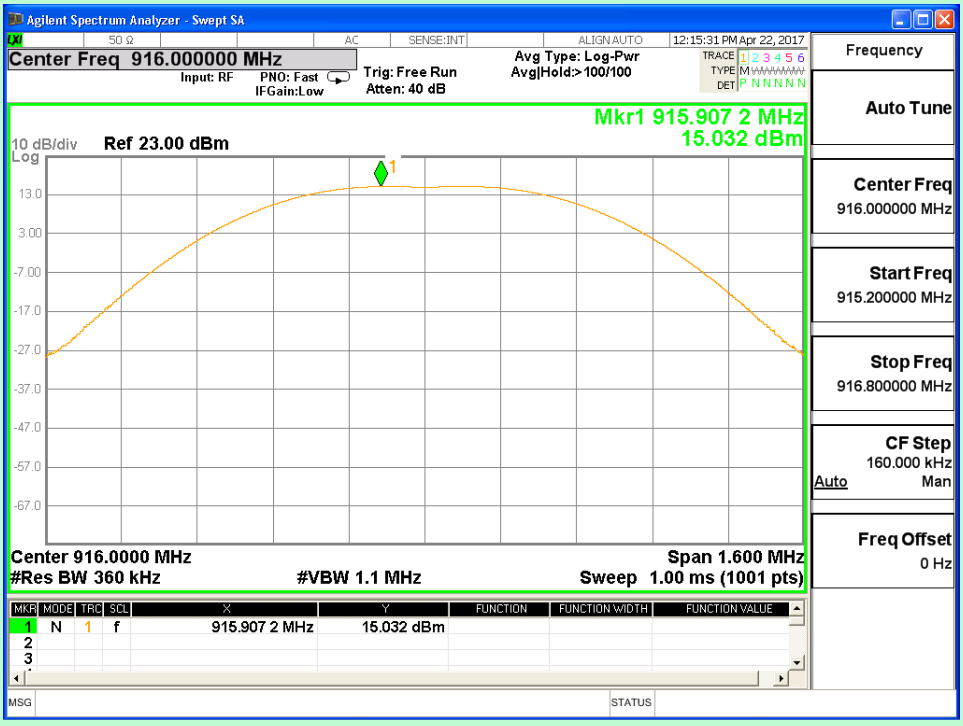
TEST EQUIPMENT

Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	Spectrum Analyzer	Agilent	N9010A	MY48031005	22-Feb-2018
Y	RF Cable	Huber- Suhner	SF104/2X11PC3542/500	NA	NA

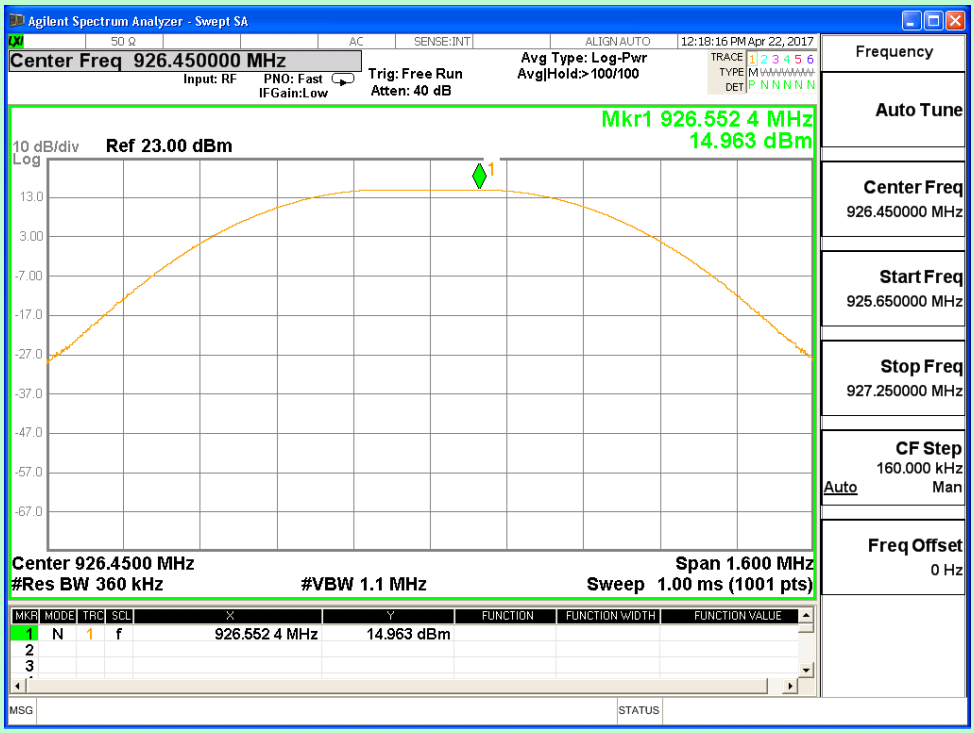
TEST GRAPHS



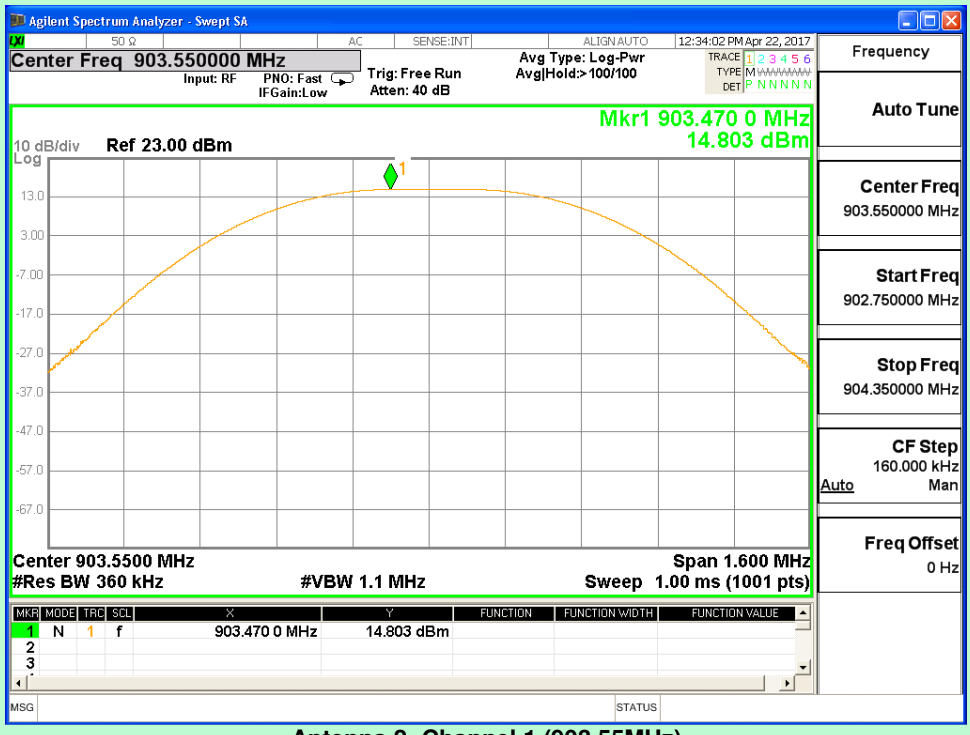
Antenna 1- Channel 1 (903.55MHz)



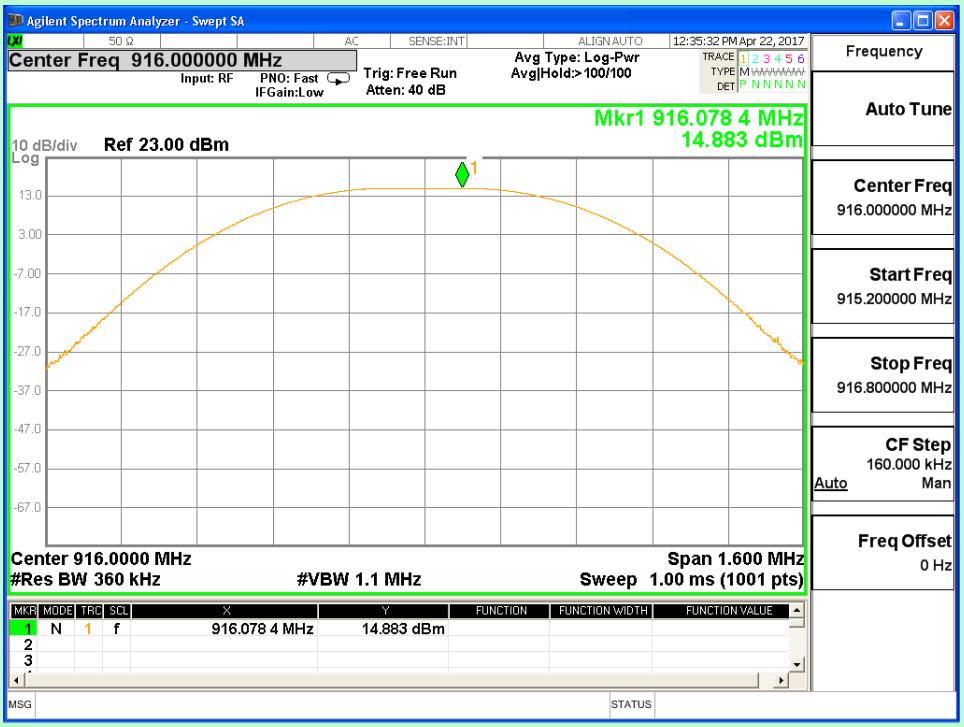
Antenna 1- Channel 28 (916MHz)



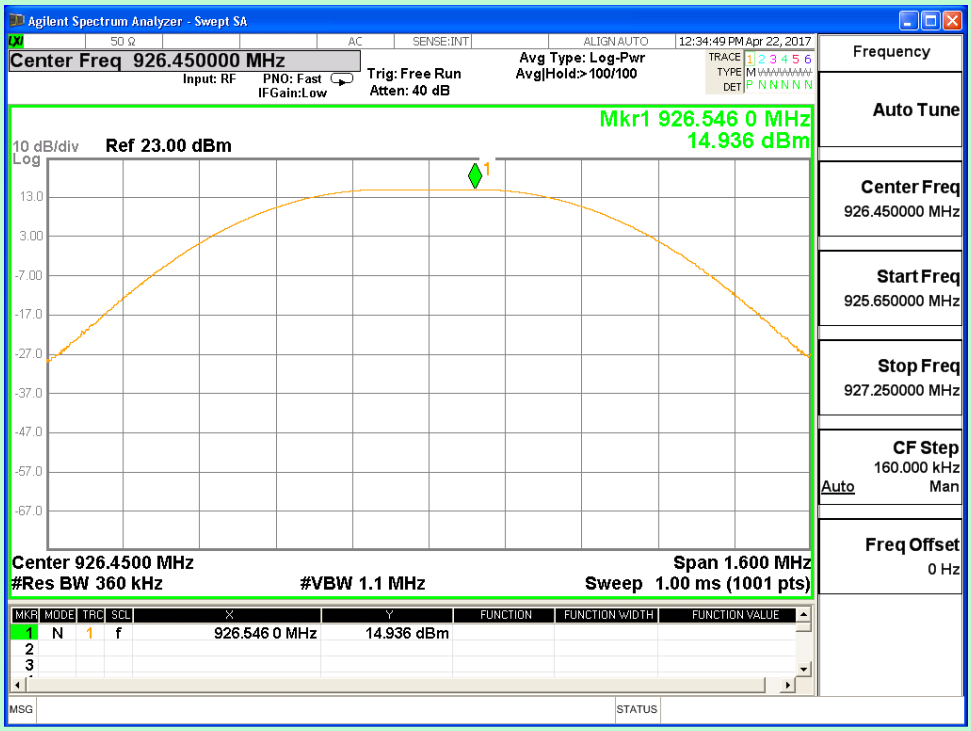
Antenna 1-Channel 55 (926.45MHz)



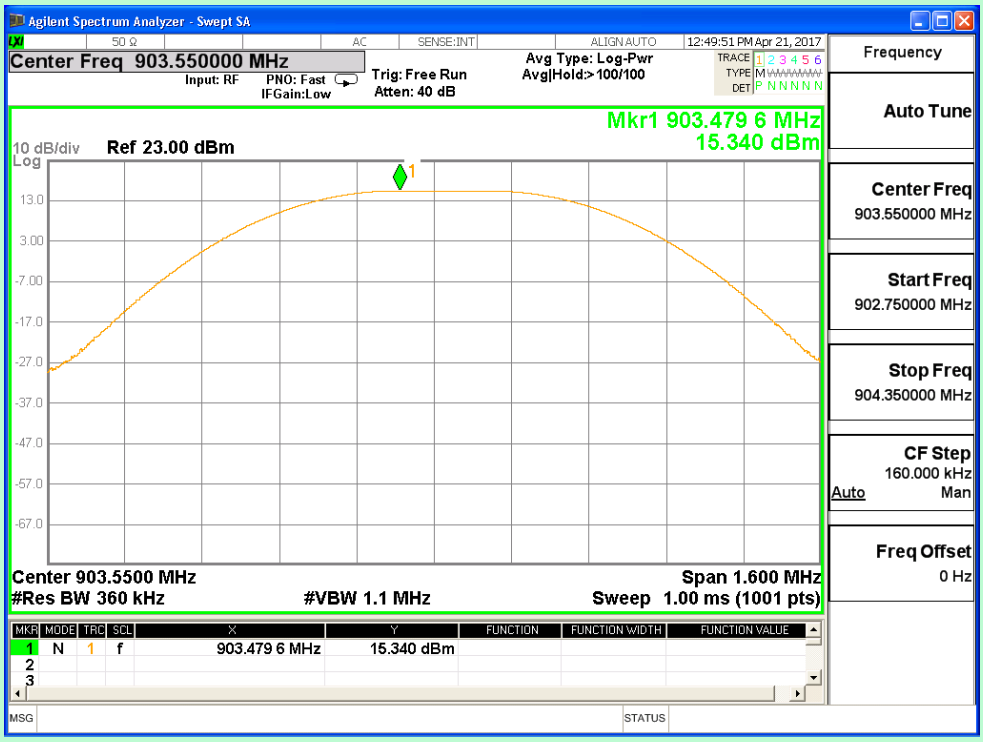
Antenna 2- Channel 1 (903.55MHz)



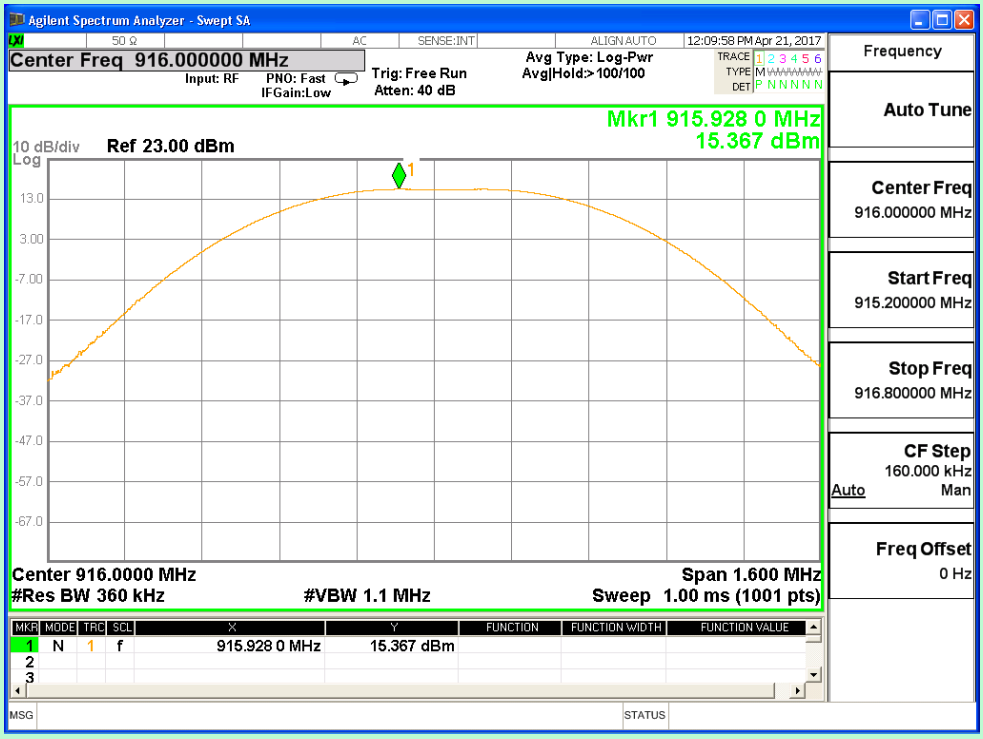
Antenna 2- Channel 28 (916MHz)



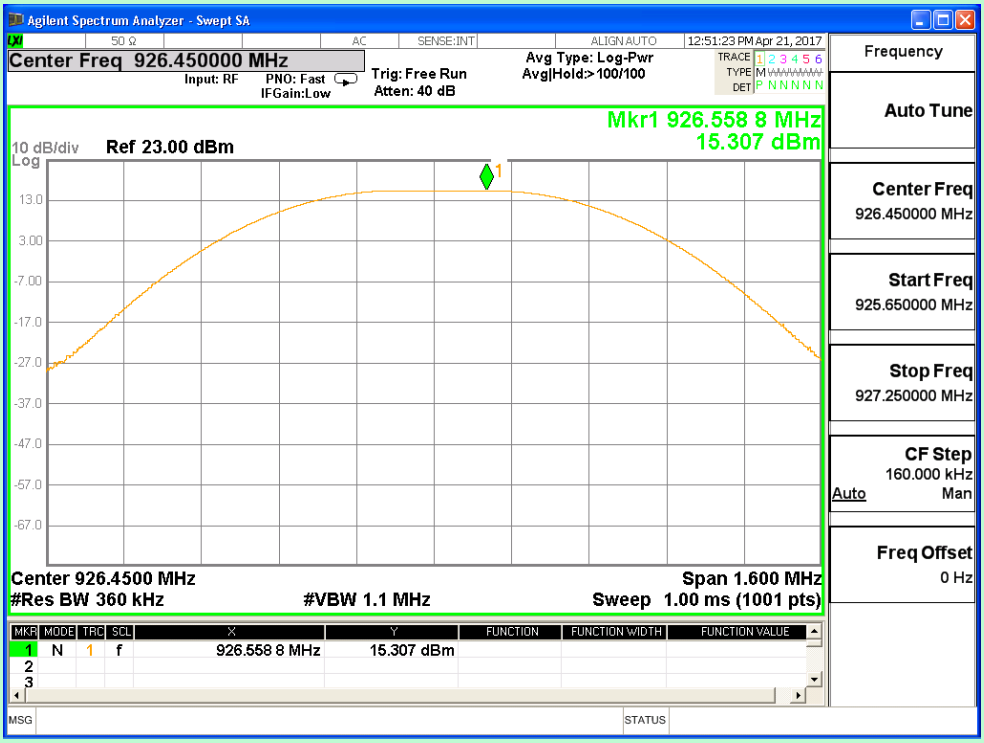
Antenna 2-Channel 55 (926.45MHz)



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	14.99	0.9	15.89	<=23.979	PASS
28	916.00	15.03	0.9	15.93	<=23.979	PASS
55	926.45	14.96	0.9	15.86	<=23.979	PASS
Antenna 2						
1	903.55	14.8	0.9	15.7	<=23.979	PASS
28	916.00	14.88	0.9	15.78	<=23.979	PASS
55	926.45	14.93	0.9	15.83	<=23.979	PASS
Antenna 3						
1	903.55	15.34	0.9	16.24	<=23.979	PASS
28	916.00	15.379	0.9	16.279	<=23.979	PASS
55	926.45	15.3	0.9	16.2	<=23.979	PASS

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

TEST SETUP PHOTOGRAPH

Refer Annexure -1

Conducted RF Test setup