

Wireless AV Base

Model No.: WAV-CWL

Date: 2020-02-12

Report Prepared By:
Shaithanya C

EMC Test Report



Report Number	EMC0423-1
EUT Nomenclature	Wireless AV Base
Sample Identification	Model No : WAV-CWL
	SL. No : 106
	Software Version : 5.88
	Hardware Version : Rev 3
Number of Samples	1
Date of receipt of Sample	12-Nov-2019
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 FCC FRN No.	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	14-Dec-2019 to 06-Jan-2020
Applicable Standard	FCC Part 15 : 2010, ANSI C63.10:2013
Test Results	PASS

Prepared By: Test Engineer

Name : Shaithanya C

Signature:

Date : 12 Feb 2020

Reviewed By: Prasanna Kumar BT
(e-mail approval)

Authorized Signatory:

Name : Prasanna Kumar BT

Signature:

Date of Issue: 14 Feb 2020

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					
Test Performed	Name	Specification	Test Method	Pass	Fail
FHSS					
☐	20dB Bandwidth	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Maximum Peak Output Power	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Carrier Frequency Separation	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Number of Hopping Frequencies	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Band Edge compliance	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Time of Occupancy (Dwell Time)	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☐	Spurious RF Conducted Emissions	FCC Part 15.247 :2010	DA 00-705	Refer Note 1	☐
☒	Effective Isotropic Radiated Power	FCC Part 15.247: 2010 and 15.209: 2010	KDB 412172	☒	☐
☒	Spurious Radiated Emissions	FCC Part 15.247: 2010 and 15.209: 2010	DA 00-705 ANSI C63.10 - 2013	☒	☐
DTS					
☐	DTS 6dB Bandwidth	FCC Part 15.247: 2010	KDB 558074	Refer Note 1	☐
☐	Maximum Peak Output Power	FCC Part 15.247: 2010	KDB 558074	Refer Note 1	☐
☐	Maximum Power Spectral Density	FCC Part 15.247: 2010	KDB 558074	Refer Note 1	☐
☐	Band Edge Conducted Emissions	FCC Part 15.247: 2010	KDB 558074	Refer Note 1	☐
☒	Effective Isotropic Radiated Power	FCC Part 15.247: 2010 and 15.209: 2010	KDB 412172	☒	☐
☒	Spurious Radiated Emissions	FCC Part 15.247: 2010 and 15.209: 2010	KDB 558074 ANSI C63.10 - 2013	☒	☐
Note 1: - As part of permissive change testing and recommended by TCB, Only Spurious Radiated Emissions and Effective Isotropic Radiated Power for both FHSS and DTS is performed as there is one RF Switch (Drop-in replacement) changed.					

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	Radiated Spurious Emission < 1GHz	4.3dB
2	Radiated Spurious Emission > 1GHz	5.5dB

Decision Rule Applied

☒	<i>Measurement Uncertainty is not accounted while reporting statement of conformity to specification / standard. (shared risk)</i>
☐	<i>Measurement uncertainty is accounted and results reported as per ILAC-G8 guidelines</i>

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 (Diameter x Height)	13 cm x 4 cm x 15cm
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
Radiated Test	EUT is Powered from Battery. EUT Debug port (UART) is connected to Laptop through USB to UA RT converter cable. EUT is configured to the respective operating mode through Hyper Terminal. Test is performed at Antenna 1(Transmitting Antenna) as this is high gain antenna.

OPERATING MODES

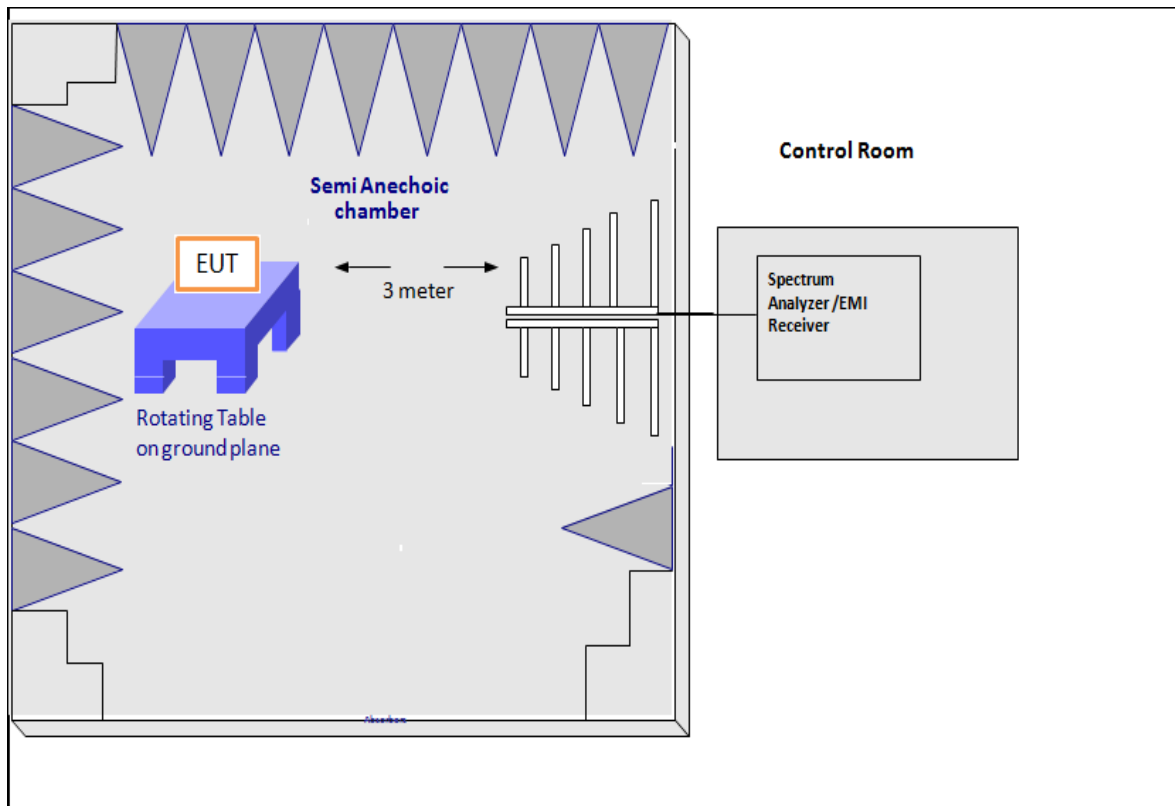
Mode #	Description
DTS	Following DTS channels have been used for Conducted (Continuous Trans mission) and Radiated (Continuous Trans mission) Tests Channel 1: 902.875MHz Channel 4: 915.325MHz Channel 6: 927.125MHz
FHSS	Following FHSS channels have been used for Conducted (Continuous Trans mission) and Radiated (Continuous Trans mission) 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 DC = DC Power Port TP = Telecommunication Ports (E.g. Ethernet) DI / DO = Digital Input / Output N / E = Non Electrical AI / AO = Analog Input / Output					

SUPPORT EQUIPMENTS AND ACCESSORIES USED

#	Item Description	Make	Model	Part No. / Sl. No	Cal Due Date
1	Laptop	DELL	Latitude 5490	4329171074	NA
2	USB to UART Cable	FTDI	TTL-232R-3V3	NA	NA

CONNECTION DIAGRAM AND SETUP DIAGRAM**Radiated Emission Test Setup**

2 FHSS CHANNELS

2.1 SPURIOUS RADIATED EMISSIONS

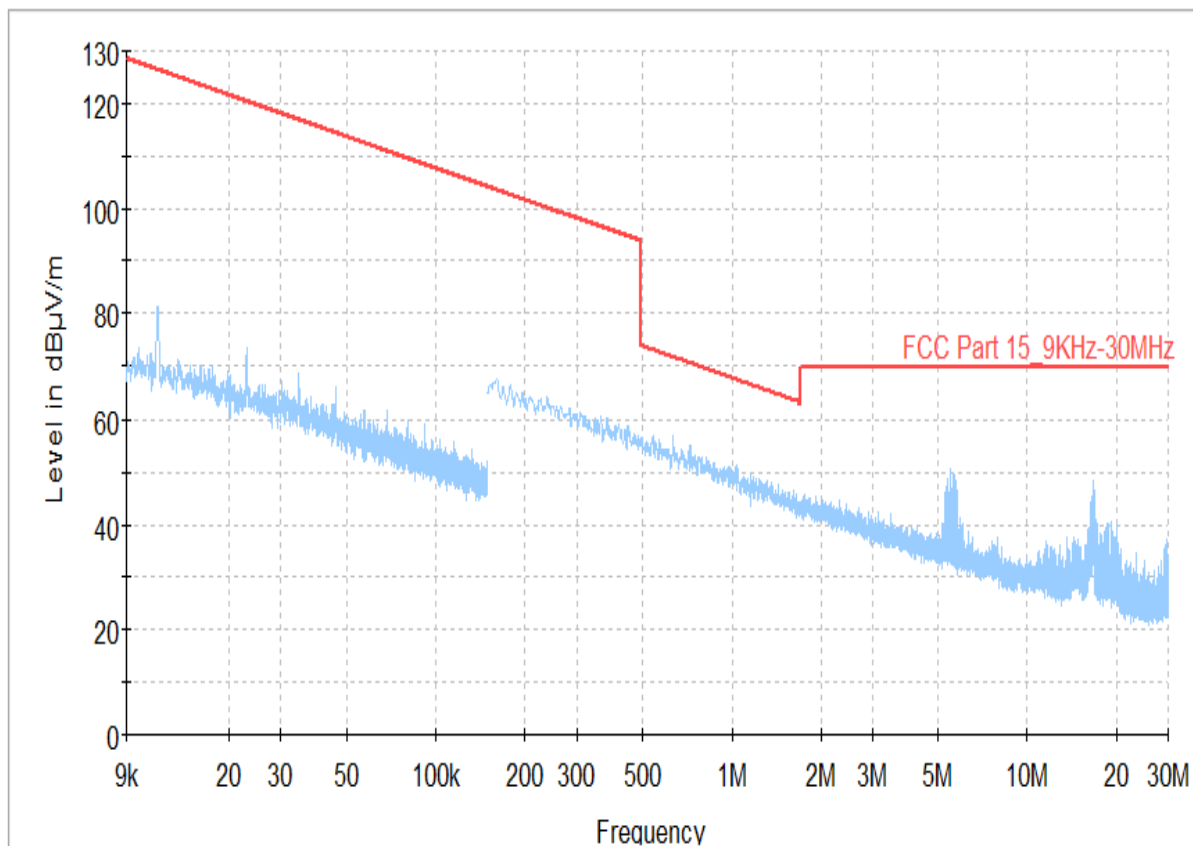
EUT Nomenclature	Wireless AV Base	Test Report No.	EMC0423-1
Model No.	WAV-CWL	Serial No.	106
Test Start Date	14-Dec-2019	Temperature (°C)	23 ± 2
Test End Date	06-JAN-2020	Humidity RH (%)	55 ± 3
Tested By	Shaithanya C	Pressure (mbar)	NR
Input Voltage / Freq	3.3V, 22mA		
Operating Mode	Refer Page 5 Operating Modes Table		
Test configuration	Refer Page 5 Test Configuration Table		
Deviation from Std	NA		
Comment	NA		
TEST FREQUENCY RANGE			
Start Frequency	9KHz	Stop Frequency	10GHz
MAXIMUM OPERATING FREQUENCY			
902MHz to 928MHz			
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Applicable standard	FCC Part 15.247 & 15.209 :2010	Test Method	DA 00-705, ANSI C63.10 - 2013
Equipment Class	NA	Measurement Distance	3m

TEST EQUIPMENT

Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	EMI Test Receiver	R&S	ESU26	100229	7-Aug-20
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	30-Jul-22
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	64055	1-Nov-21
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	5-Nov-21
Y	Loop Antenna	ETS Lindgren	6507	103694	15-Nov-21
Y	RF cable (9KHz to 18GHz)	AH Systems	SAC-18G-06	RE-03	20-Feb-20
Y	Signal Conditioning unit	R&S	SCU-18	10178	5-Jun-20
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	24-Feb-20
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

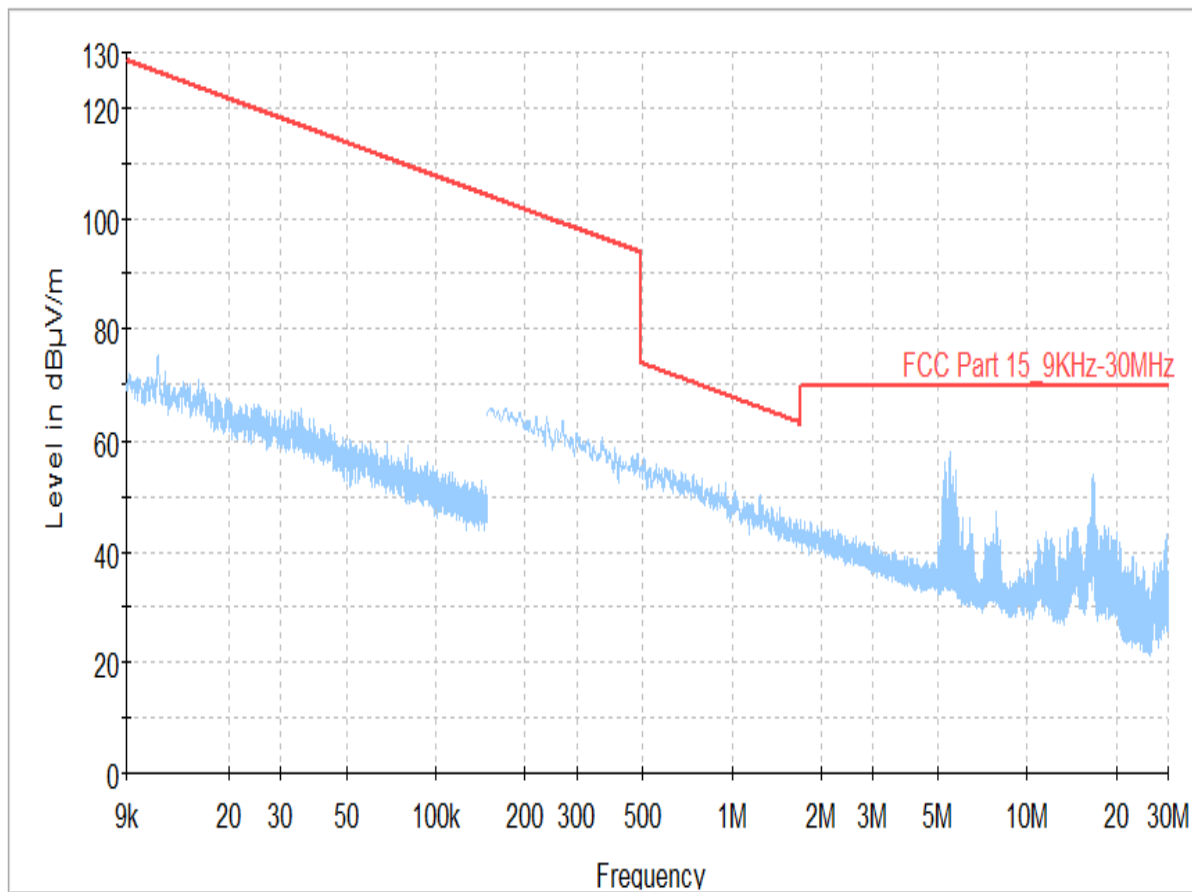
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



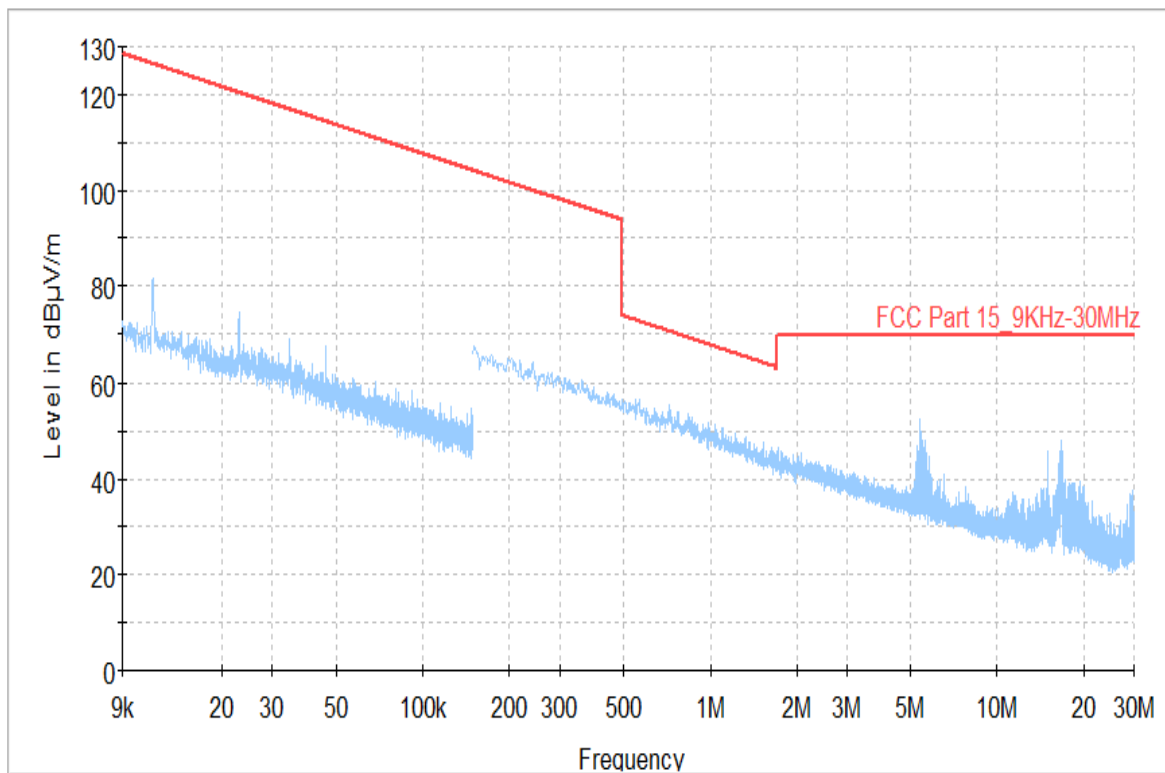
Channel 1 (903.55MHz) – Parallel

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



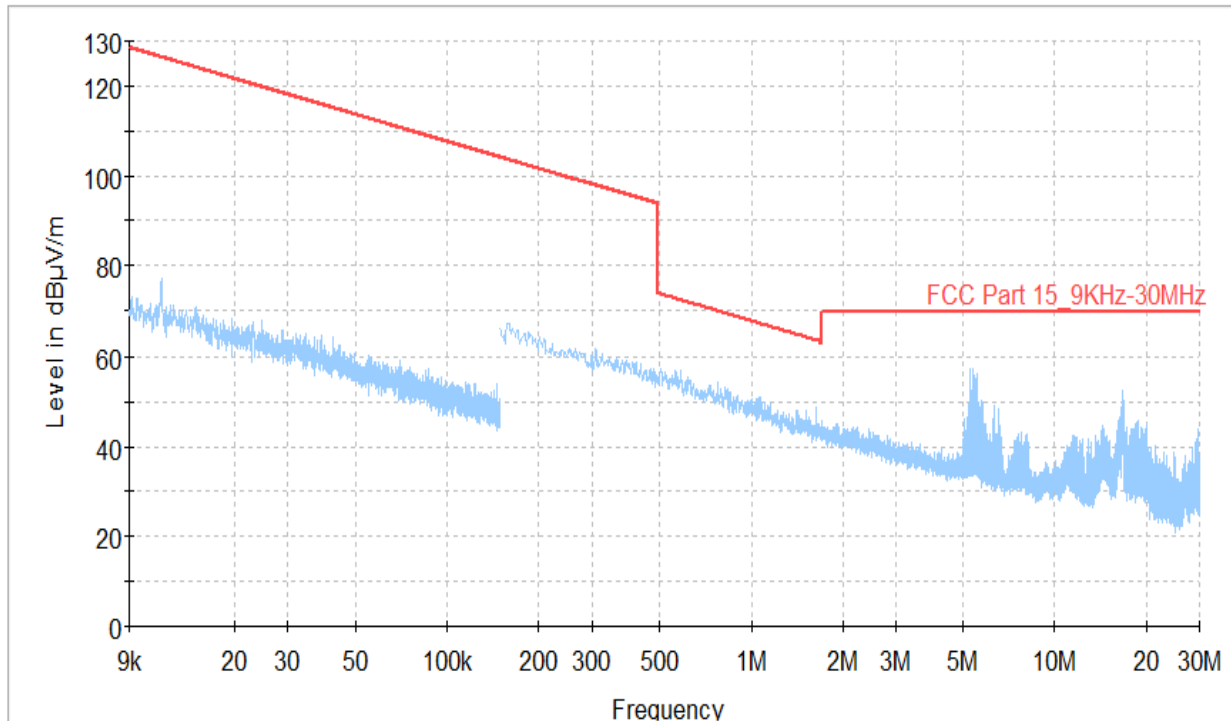
Channel 1 (903.55MHz) – Perpendicular

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



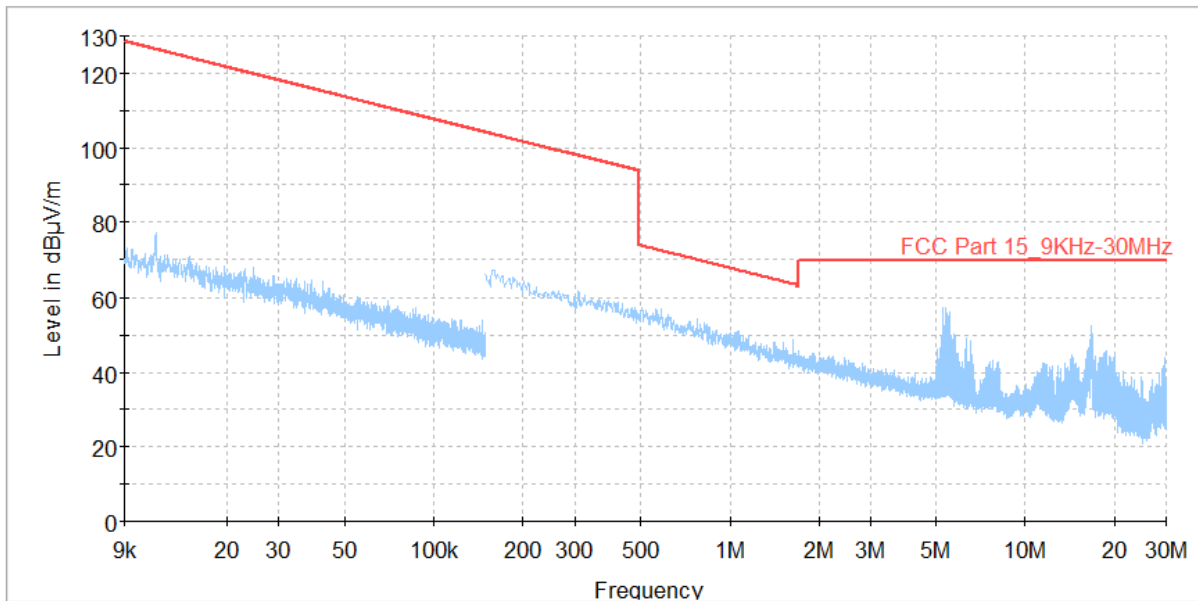
Channel 28 (916 MHz) – Parallel

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



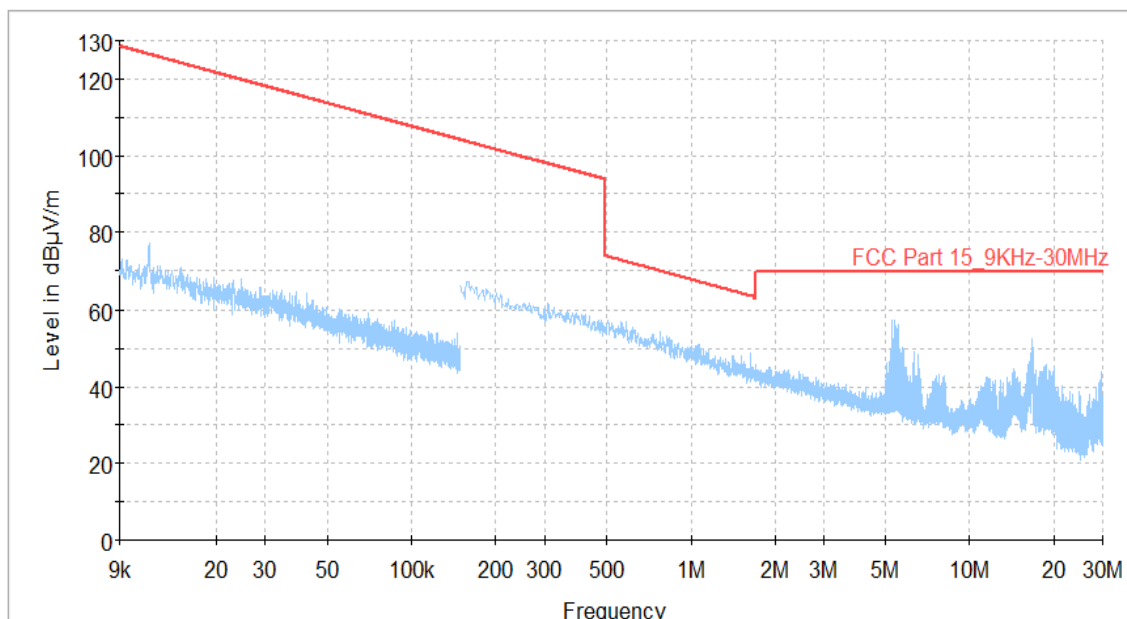
Channel 28 (916 MHz) – Perpendicular

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



Channel 55 (926.45MHz) – Parallel

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)

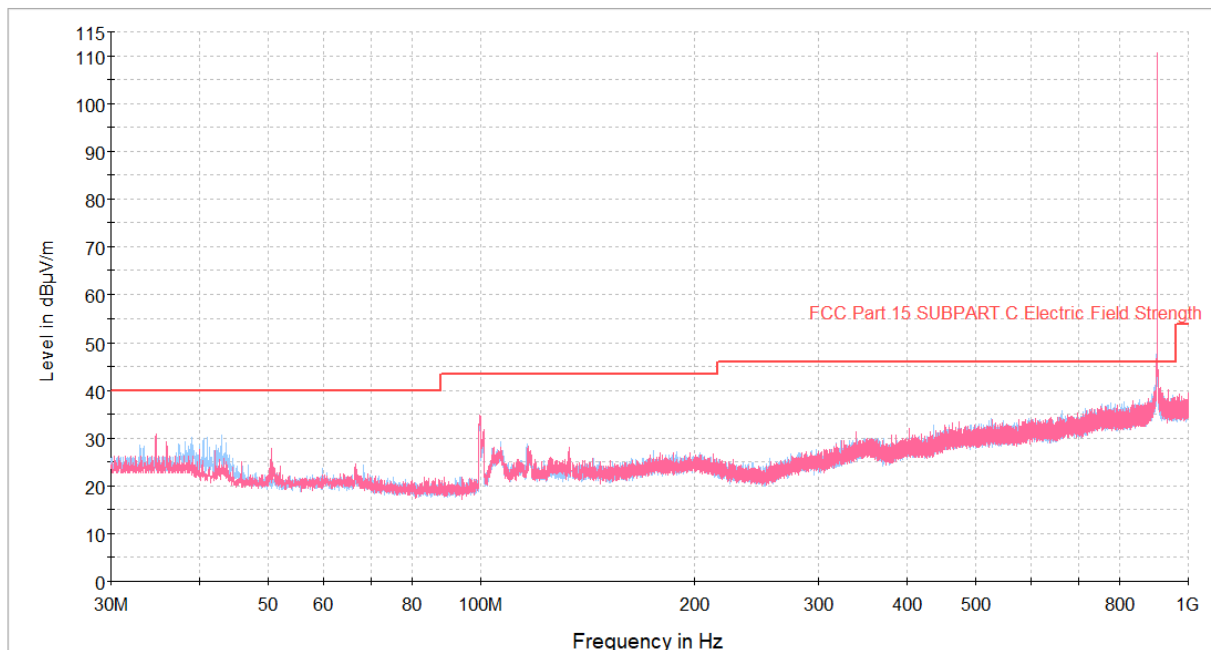


Channel 55 (926.45MHz) – Perpendicular

TEST RESULT – 9 KHz to 30 MHz

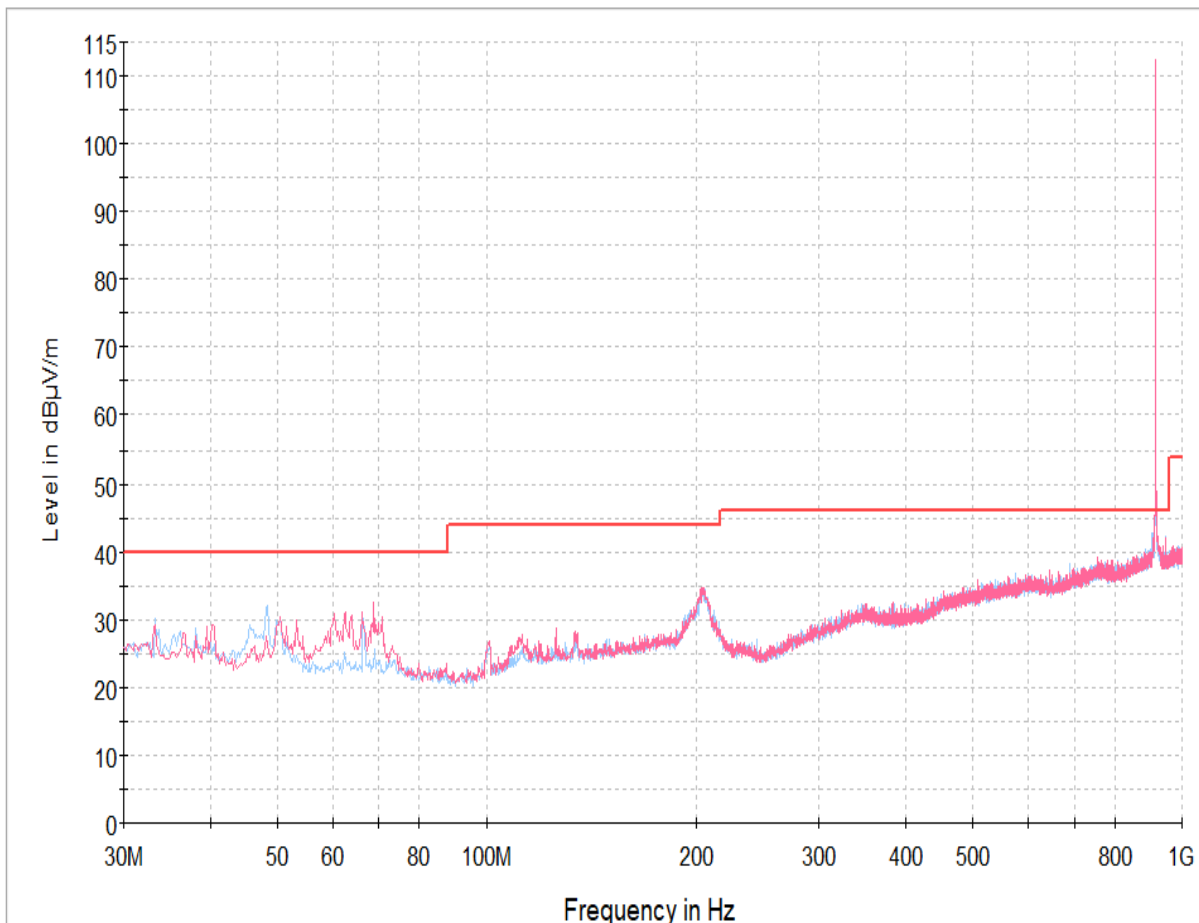
Channel	Channel Frequency	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	MHz	dBμV/m	cm	Parallel / Perpendicular	deg	dB	dBμV/m	
No emissions detected that are a product of the transmitter. Emissions shown in the plot are related to the chamber ambient									
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



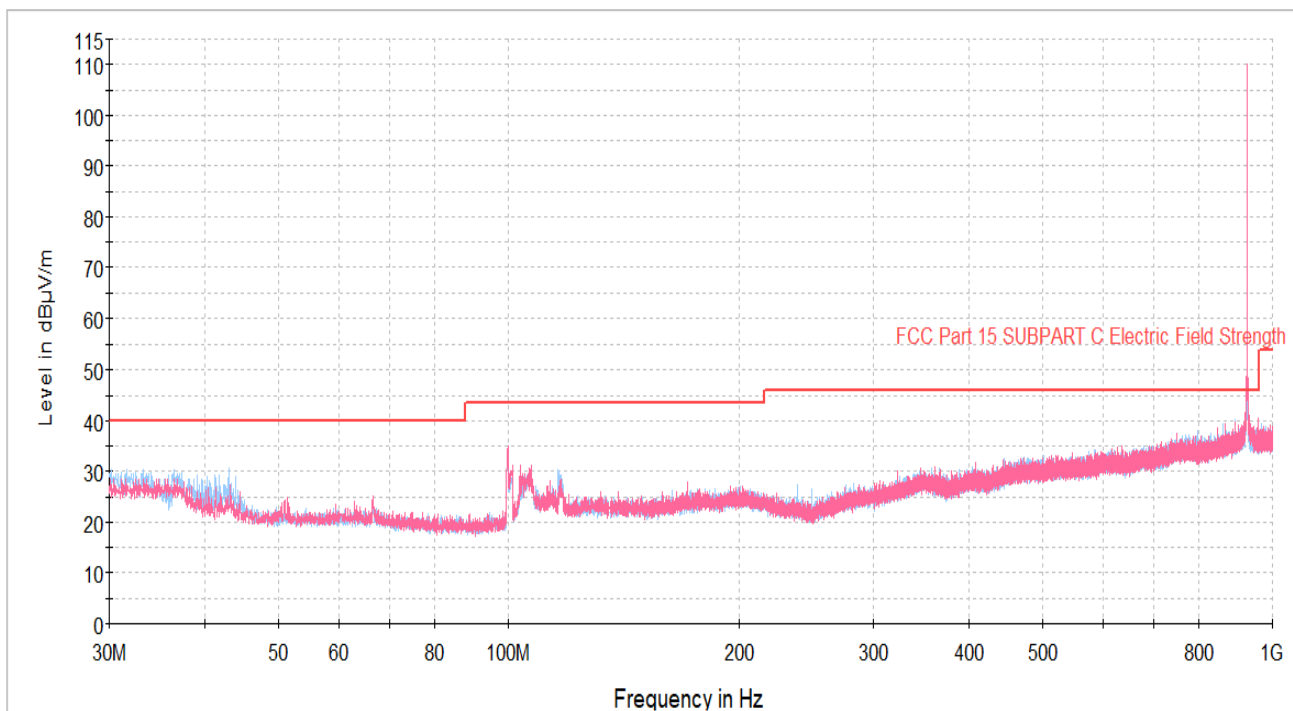
Channel 1 (903.55MHz) – Antenna 1

TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



Channel 28 (916.0MHz) – Antenna 1

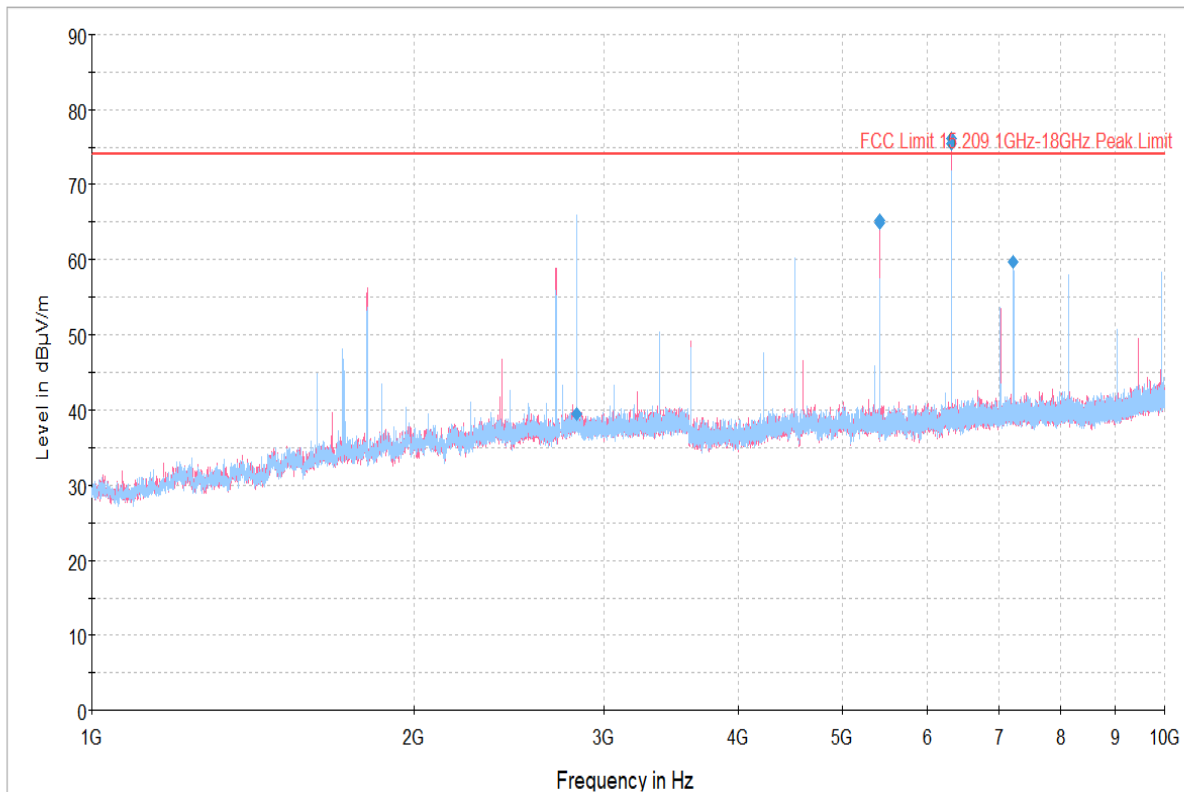
TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



Channel 55 (926.45MHz) – Antenna 1

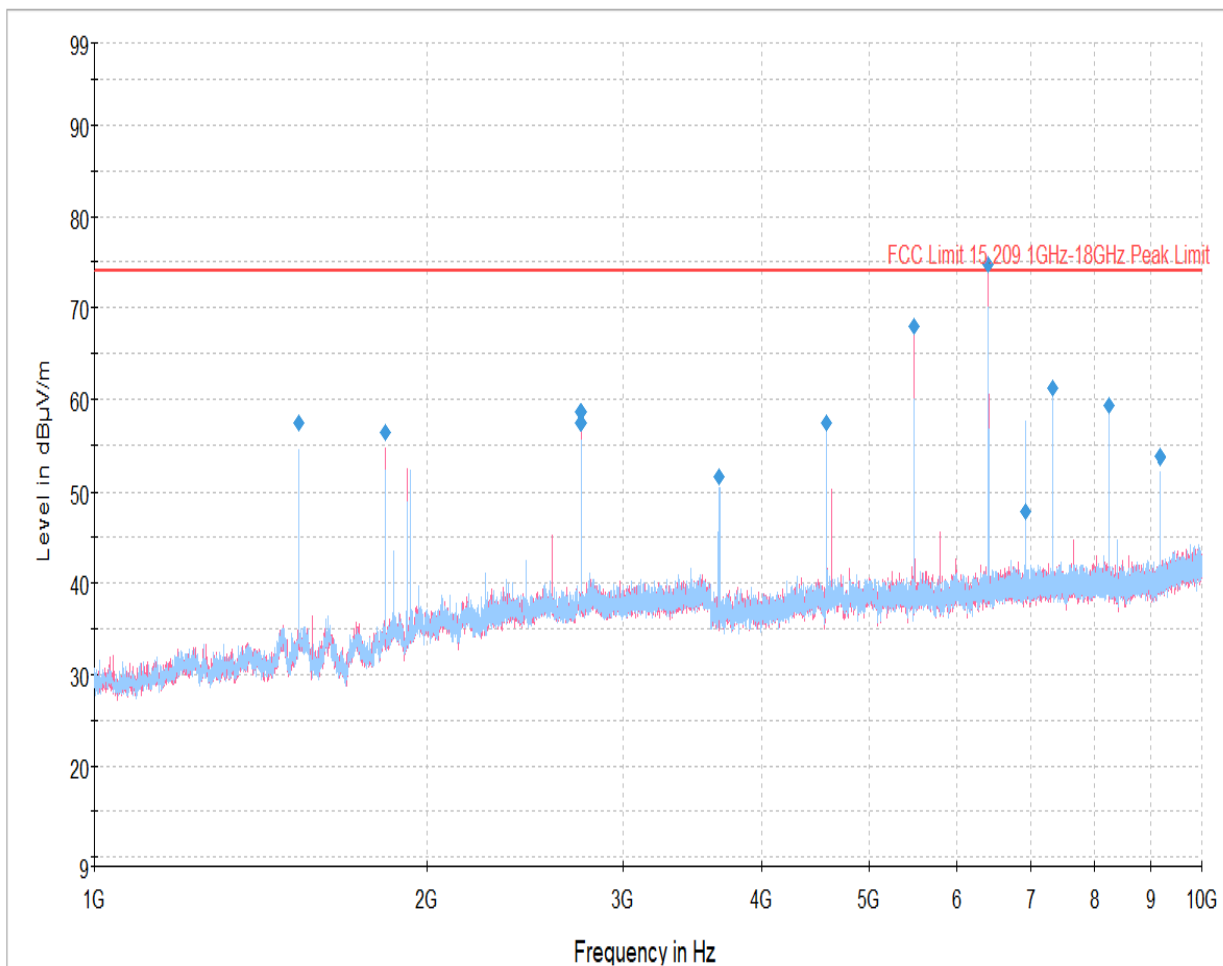
TEST RESULT – 30MHz to 1GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	cm	H / V	deg	dB	dBµV/m	
Antenna – 1								
CH-1	830.06	32.49	100	H	74	13.51	46	Pass
CH-1	849.84	33.47	200	V	136	12.53	46	Pass
CH-1	935.59	39.85	200	V	136	6.15	46	Pass
CH-1	939.86	33.96	200	V	302	12.04	46	Pass
CH-1	903.55	110.64	100	V	87	-	-	Intended Frequency
CH-28	755.37	32.52	300	V	3	13.48	46	Pass
CH-28	836.26	32.75	300	H	33	13.25	46	Pass
CH-28	849.07	33.03	300	H	202	12.97	46	Pass
CH-28	953.63	34.25	200	V	172	11.75	46	Pass
CH-28	916.39	112.59	100	H	339	-	-	Intended Frequency
CH-55	776.32	32.46	400	H	38	13.54	46	Pass
CH-55	843.83	32.95	100	H	289	13.05	46	Pass
CH-55	918.33	37.43	100	V	136	8.57	46	Pass
CH-55	958.29	35.03	100	V	132	10.97	46	Pass
CH-55	926.09	109.96	100	V	120	-	-	Intended Frequency
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



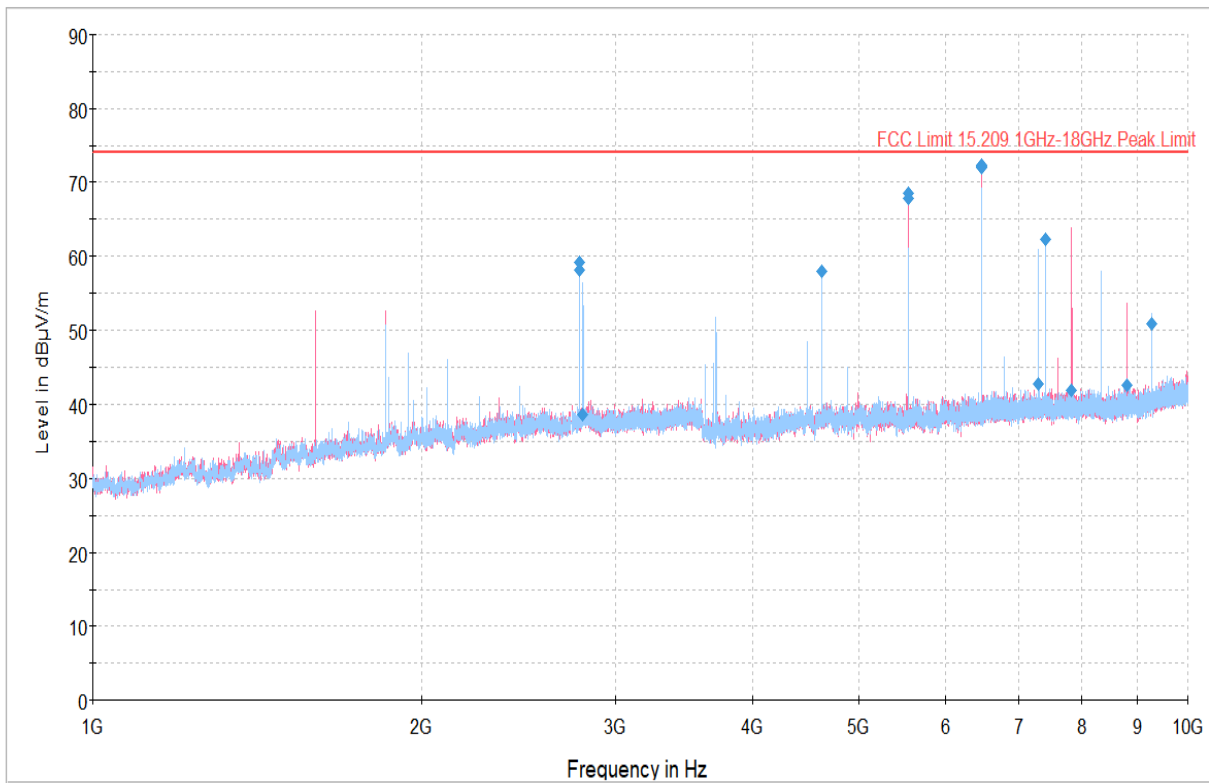
Channel 1 (903.55MHz) – Antenna 1

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



Channel 28 (916.0MHz) – Antenna 1

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



Channel 55 (926.45MHz) – Antenna 1

TEST RESULT – 1 GHz to 10 GHz						RESTRICTED BAND – PEAK & AVERAGE					
Channel	Frequency	Measured Field Strength Peak	Height	Ant Pol	Azimuth	Peak Margin	Peak Limit	Calculated Average Reading [Peak – Duty cycle]	Average Limit	Average Margin	Result
#	MHz	dBμV/m	cm	H / V	deg	dB	dBμV/m	dBμV/m	dBμV/m	dBμV/m	
Antenna – 1											
CH-1	2827.32	39.52	300	H	344	34.48	74	21.45	54	32.55	PASS
CH-1	5420.61	64.85	200	V	296	9.15	74	46.78	54	7.22	PASS
CH-1	5421.57	65.15	200	V	286	8.85	74	47.08	54	6.92	PASS
CH-28	1530.04	57.35	400	H	264	16.65	74	39.28	54	14.72	PASS
CH-28	2748.57	57.41	100	V	305	16.59	74	39.34	54	14.66	PASS
CH-28	2749.21	58.55	100	V	86	15.45	74	40.48	54	13.52	PASS
CH-28	3664.96	51.61	100	H	280	22.39	74	33.54	54	20.46	PASS
CH-28	4581.68	57.36	200	H	122	16.64	74	39.29	54	14.71	PASS
CH-28	7331.50	61.22	300	H	255	12.78	74	43.15	54	10.85	PASS
CH-28	8246.93	59.26	200	H	270	14.74	74	41.19	54	12.81	PASS
CH-28	9163.00	53.78	300	H	187	20.22	74	35.71	54	18.29	PASS
CH-55	2777.82	58.02	100	V	310	15.98	74	39.95	54	14.05	PASS
CH-55	2778.46	59.16	100	V	299	14.84	74	41.09	54	12.91	PASS
CH-55	2800.32	38.72	100	H	65	35.28	74	20.65	54	33.35	PASS
CH-55	4630.54	57.9	300	V	0	16.1	74	39.83	54	14.17	PASS
CH-55	7297.11	42.8	100	H	75	31.2	74	24.73	54	29.27	PASS
CH-55	7408.96	62.31	200	H	265	11.7	74	44.24	54	9.76	PASS
Note : Measured Field Strength –Peak dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss – Ext. Pre amplifier Gain (dB) Cal. Average Readings(dBuV/m) =Measured Peak(dBuV/m)-Duty Cycle Correction Factor(dB) Duty Cycle Correction Factor is calculated using the guidelines provided in DA 00-705 Duty Cycle Factor =$20 \times \log(\text{Dwell time} / 100\text{msec})$, Number of Transmission for 100msec: 8, Dwell time per Transmission: 1.55msec Duty Cycle correction Factor =$20 \log(1.55 \times 8 / 100) = -18.07\text{dB}$											

TEST RESULT – 1 GHz to 10 GHz							NON RESTRICTED BAND - PEAK			
Channel	Measured Fundamental	Spurious Emission	Measured Harmonic	Height	Ant Pol	Azimuth	Limit	Margin	Results	
							[Fundamental – 20 dB]			
#	dBµV/m	MHz	dBµV/m	cm	H / V	deg	dBuV/m	dB		
Antenna – 1										
CH-1	110.64	6324.46	76.21	200	V	14	90.64	14.43		PASS
CH-1	110.64	6325.43	75.45	200	V	21	90.64	15.19	PASS	
CH-1	110.64	7228.96	59.68	200	H	260	90.64	30.96	PASS	
CH-28	112.59	1832.50	56.4	400	V	39	92.59	36.19	PASS	
CH-28	112.59	5497.75	67.97	200	V	349	92.59	24.62	PASS	
CH-28	112.59	5498.39	68.04	200	V	344	92.59	24.55	PASS	
CH-28	112.59	6413.82	74.71	200	V	15	92.59	17.88	PASS	
CH-28	112.59	6414.79	74.65	200	V	15	92.59	17.94	PASS	
CH-28	112.59	6933.89	47.85	100	H	94	92.59	44.74	PASS	
CH-55	109.96	5556.25	67.79	200	V	294	89.96	22.17	PASS	
CH-55	109.96	5557.21	68.56	300	V	286	89.96	21.4	PASS	
CH-55	109.96	6481.96	72.37	400	V	300	89.96	17.59	PASS	
CH-55	109.96	6482.61	71.93	400	V	300	89.96	18.03	PASS	
CH-55	109.96	6483.25	72.22	400	V	300	89.96	17.74	PASS	
CH-55	109.96	7827.79	41.98	300	V	164	89.96	47.98	PASS	
CH-55	109.96	8799.79	42.61	300	V	10	89.96	47.35	PASS	
CH-55	109.96	9262.32	50.87	200	H	332	89.96	39.09	PASS	
Note :										
Measured Harmonic Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)										

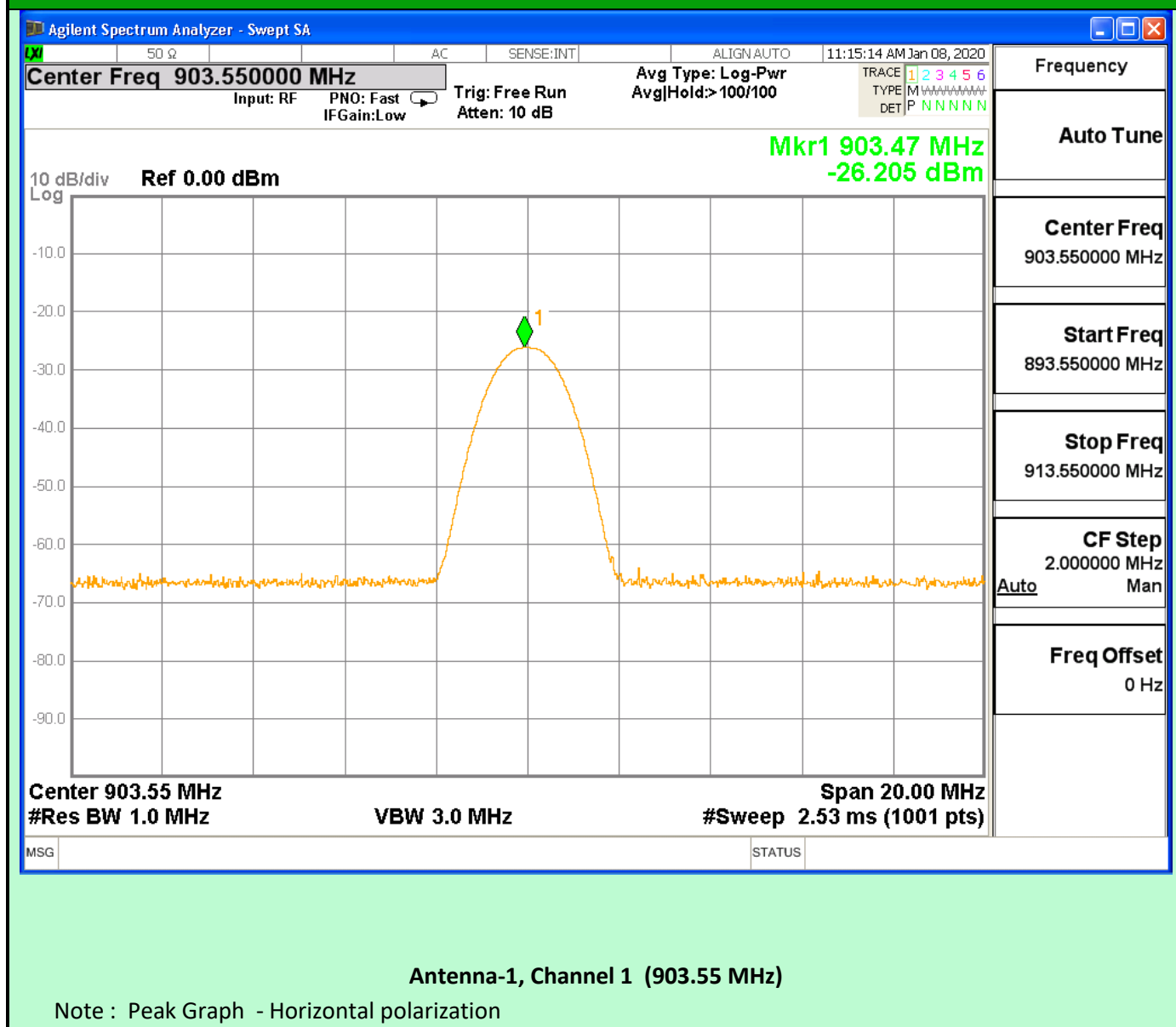
2.2 EFFECTIVE ISOTROPIC RADIATED POWER

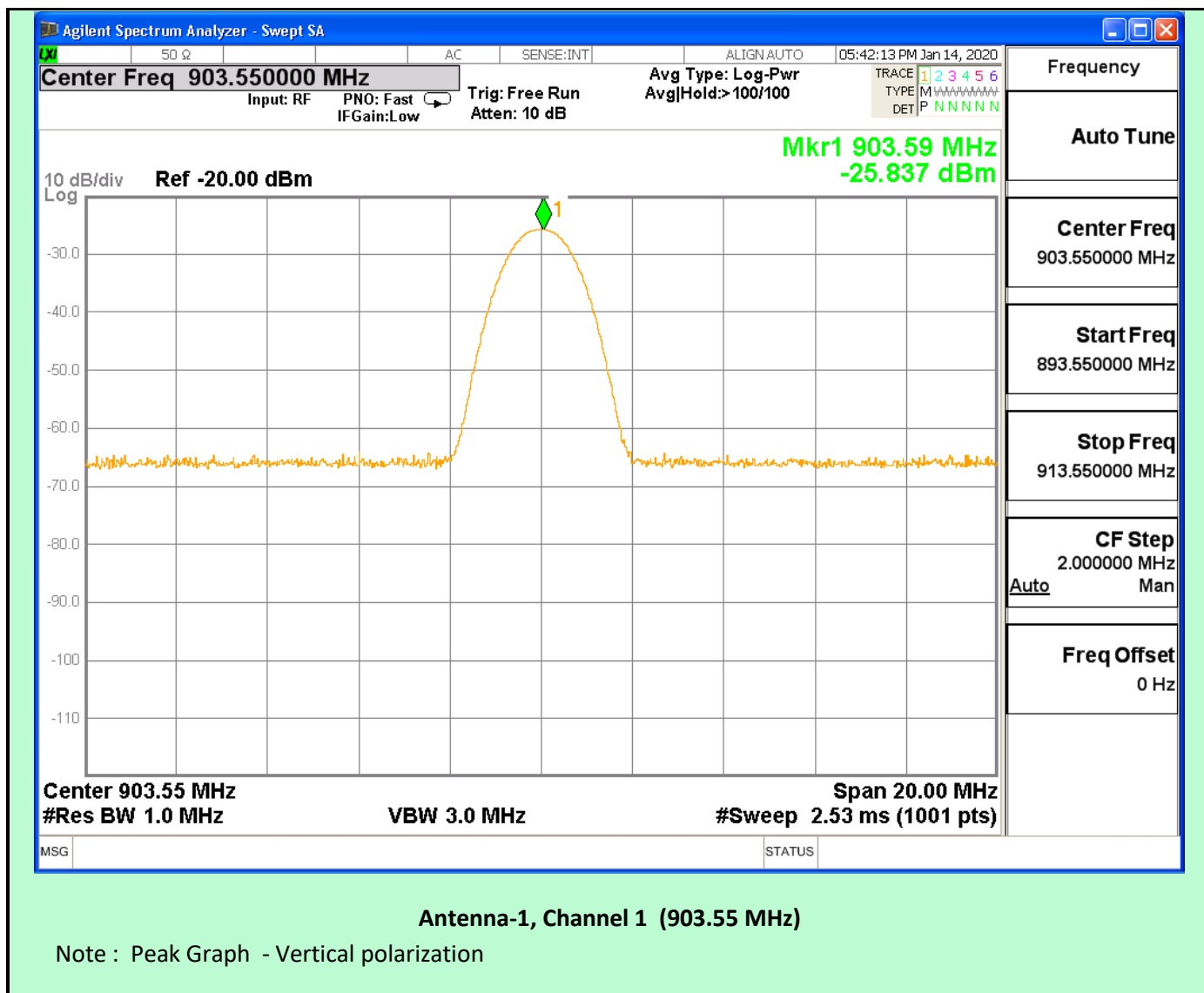
EUT Nomenclature	Wireless AV Base	Test Request No.	EMC0423-1
Model No.	WAV-CWL	Serial No.	106
Test Start Date	14-Dec-2019	Temperature (°C)	23 ± 2
Test End Date	06-Jan-2020	Humidity RH (%)	55 ± 3
Tested By	Shaithanya C	Pressure (mbar)	NR
Input Voltage / Freq	3.3V, 22mA		
Operating Mode	Refer Page 5 for Operating Mode Table		
Test configuration	Refer Page 5 for Test Configuration Table		
Deviation from Std	NA		
Applicable standard	FCC Part 15.247: 2010 & 15.209 :2010		
Test Method	KDB 412172		
Comment	NA		
TEST DETAILS			
Method	☒ Radiated ☐ Conducted		
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Equipment Class	NA	Measurement Distance	3m

TEST EQUIPMENT

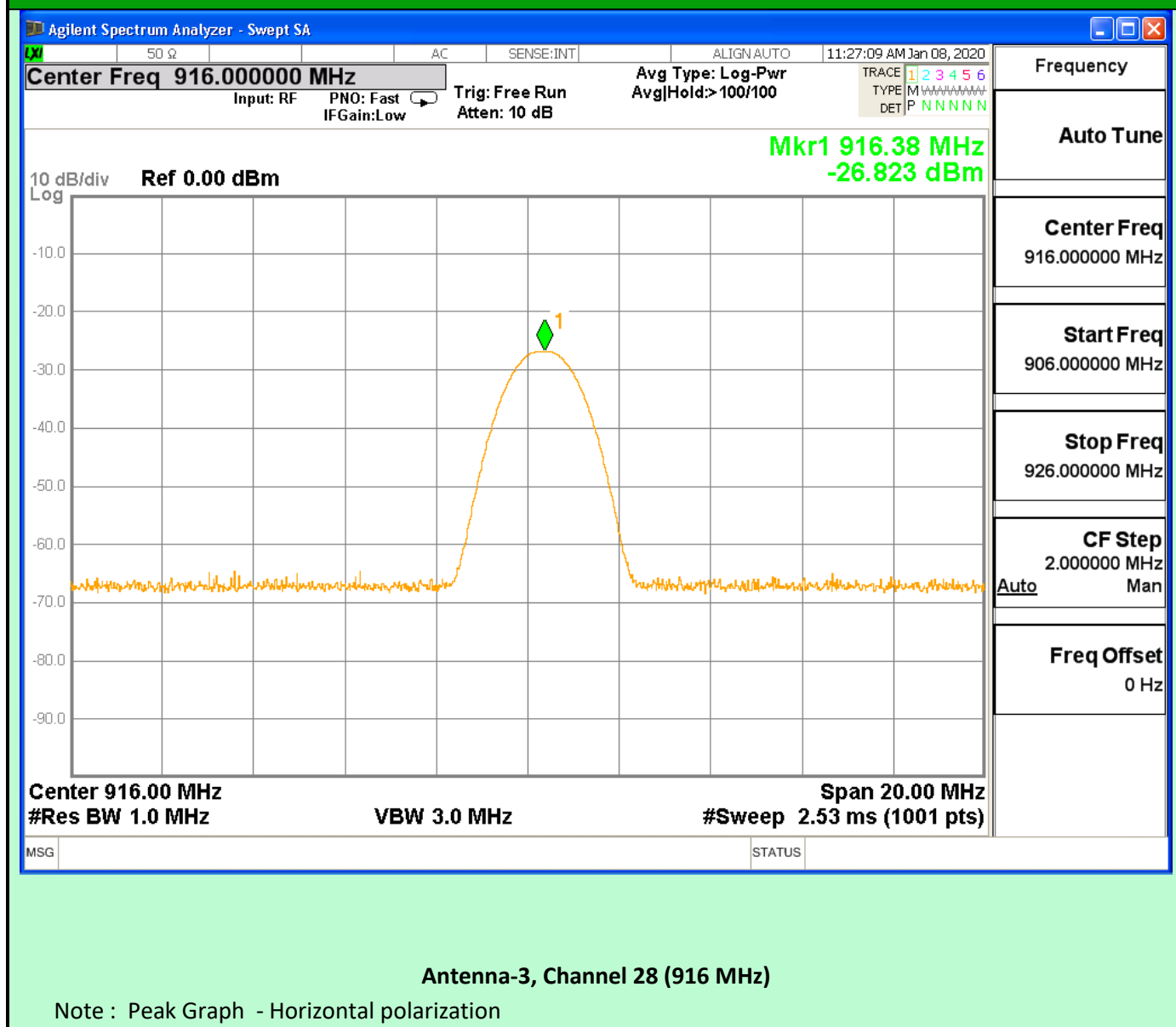
Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	EMI Test Receiver	R&S	ESU26	100525	7-Aug-20
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	30-Jul-22
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	5-Nov-21
Y	RF cable (9KHz to 1GHz)	AH System	SAC-18G-06	RE-03	20-Feb-20

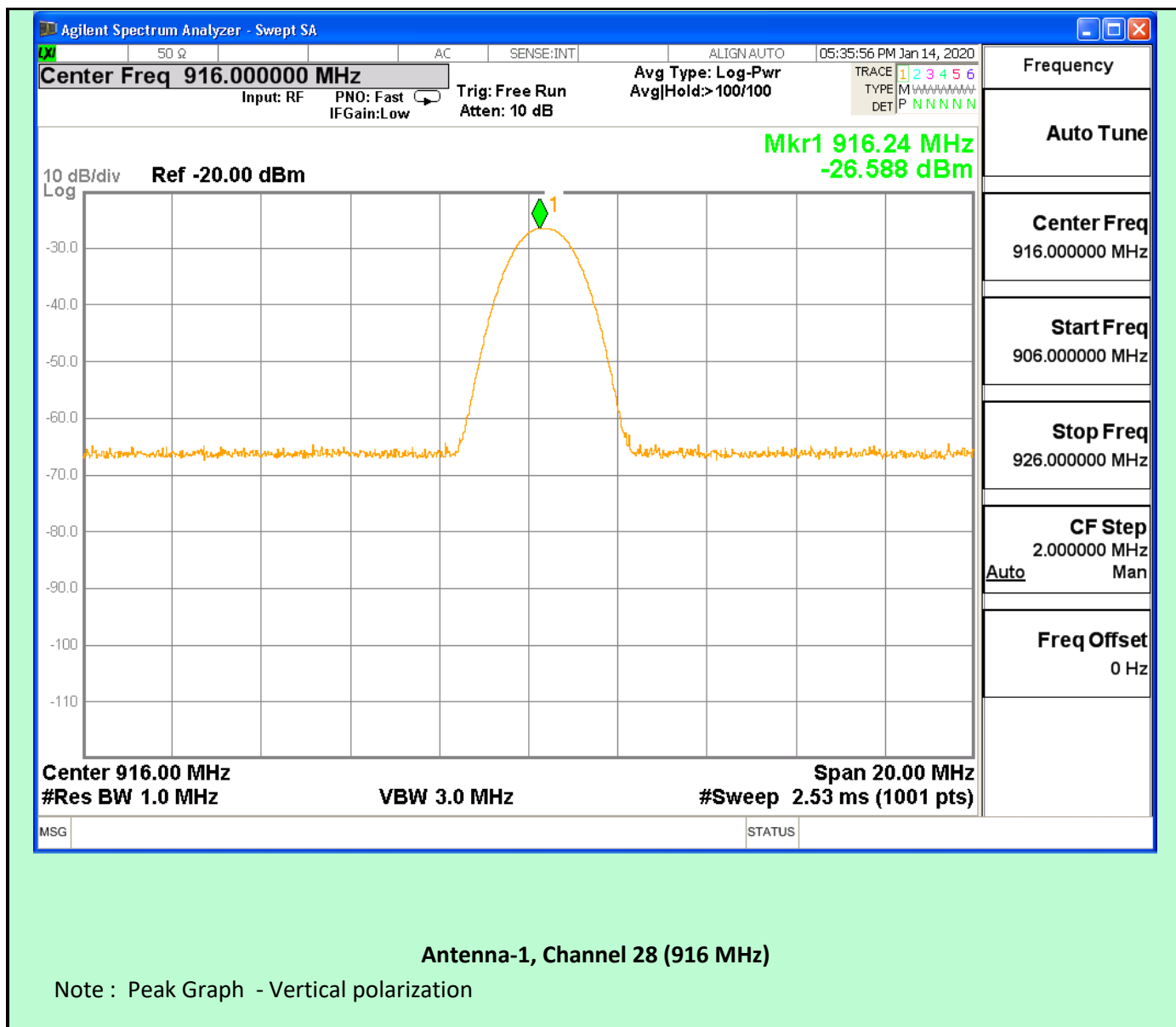
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – EIRP

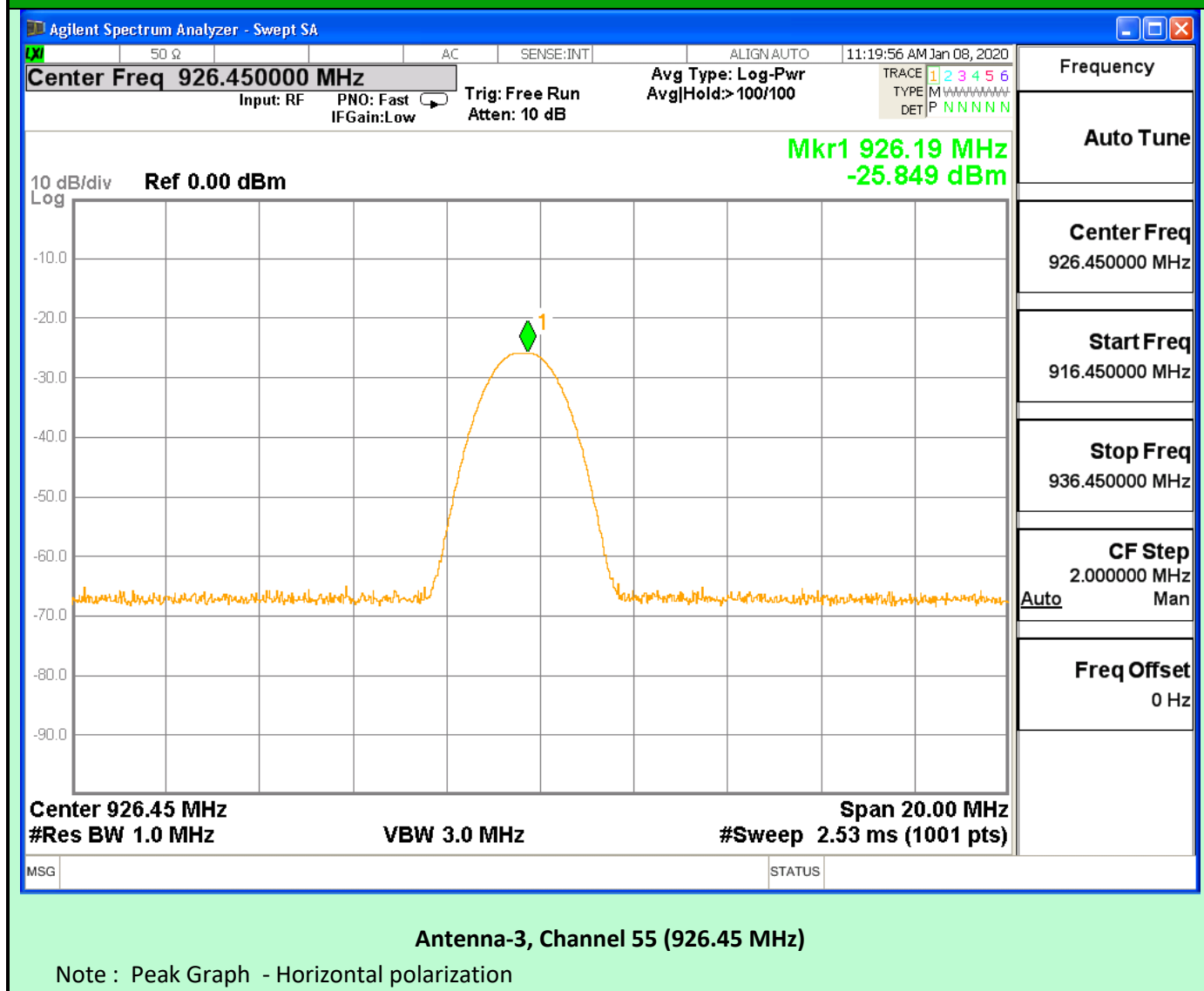


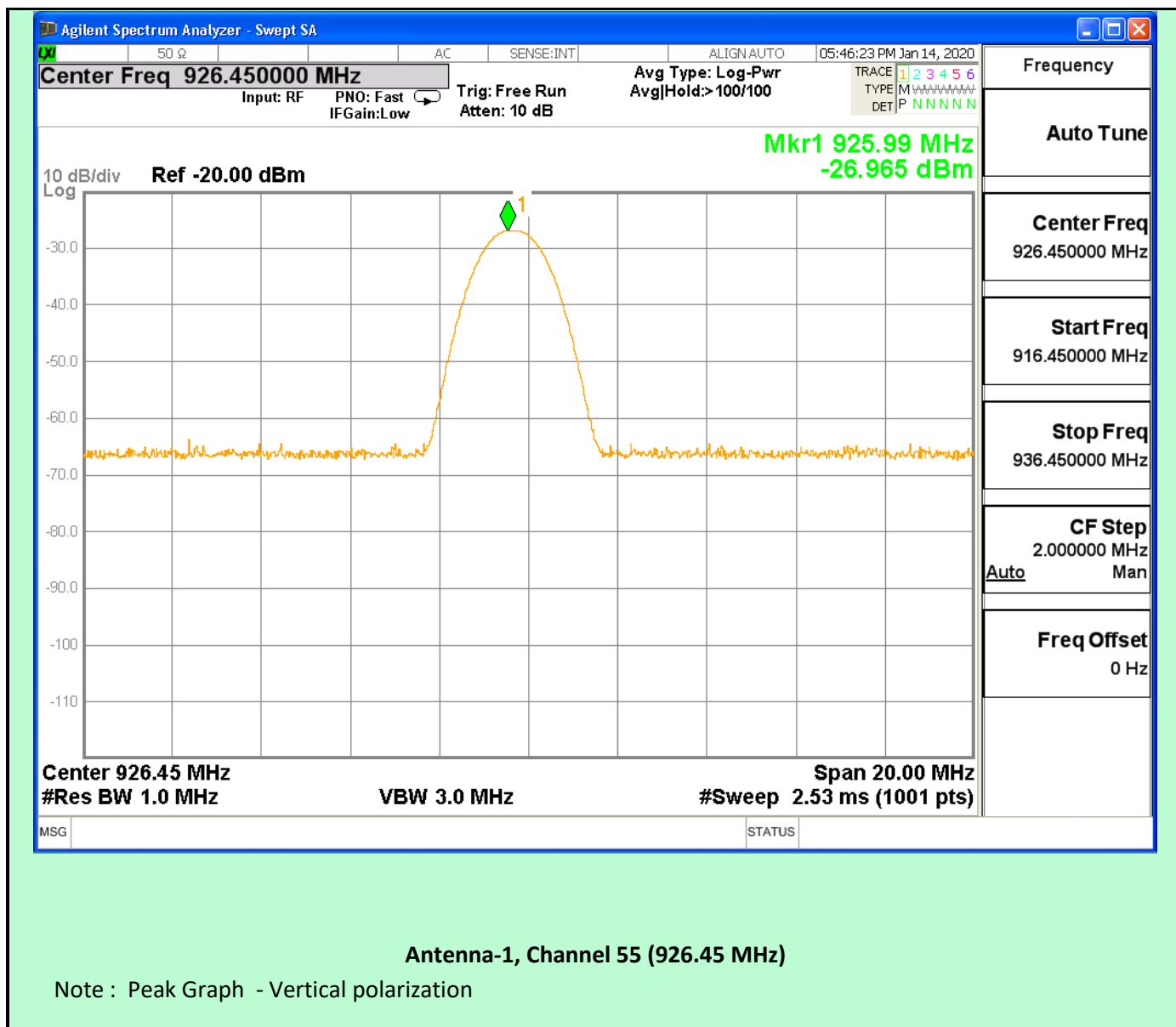
TEST GRAPHS – EIRP





TEST GRAPHS – EIRP





TEST RESULT – EIRP										
Channel	Channel Freq	Rx Antenna Height	Rx Ant Pol	Measured Level	Cable Loss	External Att	Path loss @ 3m	Rx Antenna Gain	Calculated Rx Power	Calculated EIRP
#	MHz	cm	H/V	dBm	dB	dB	dB	dBi	dBm	dBm
Antenna – 1 (FHSS Mode)										
CH-1	903.55	100	H	-26.2	2.91	6	41.21	6.3	-23.59	17.62
CH-1	903.55	115	V	-25.83	2.91	6	41.21	6.3	-23.22	17.99
CH-28	916	100	H	-26.82	2.91	6	41.21	6.3	-24.21	17
CH-28	916	165	V	-28.58	2.91	6	41.21	6.3	-25.97	15.24
CH-55	926.45	145	H	-25.84	2.91	6	41.21	6.3	-23.22	17.99
CH-55	926.45	160	V	-26.96	2.91	6	41.21	6.3	-24.35	16.86
Note : Effective Isotropic Radiated Power (dBm)= Pr(dBm) +Lp(dB) Pr = Pmeas(dBm)-Gr(dBi)+Lc(dB)+Latt(dB) Lp =20Log F+20LogD-27.5 Where: Pr =Calculated Received Power Level(dBm) Lp= Free Space Path Loss(dB) Pmeas= Measured Power Level(dBm) Gr = Receiver Antenna Gain(dBi) Lc = Cable Loss (dB) Latt= External Attenuator(dB) F = Frequency (MHz) D= Distance (m)										

3 DTS CHANNELS

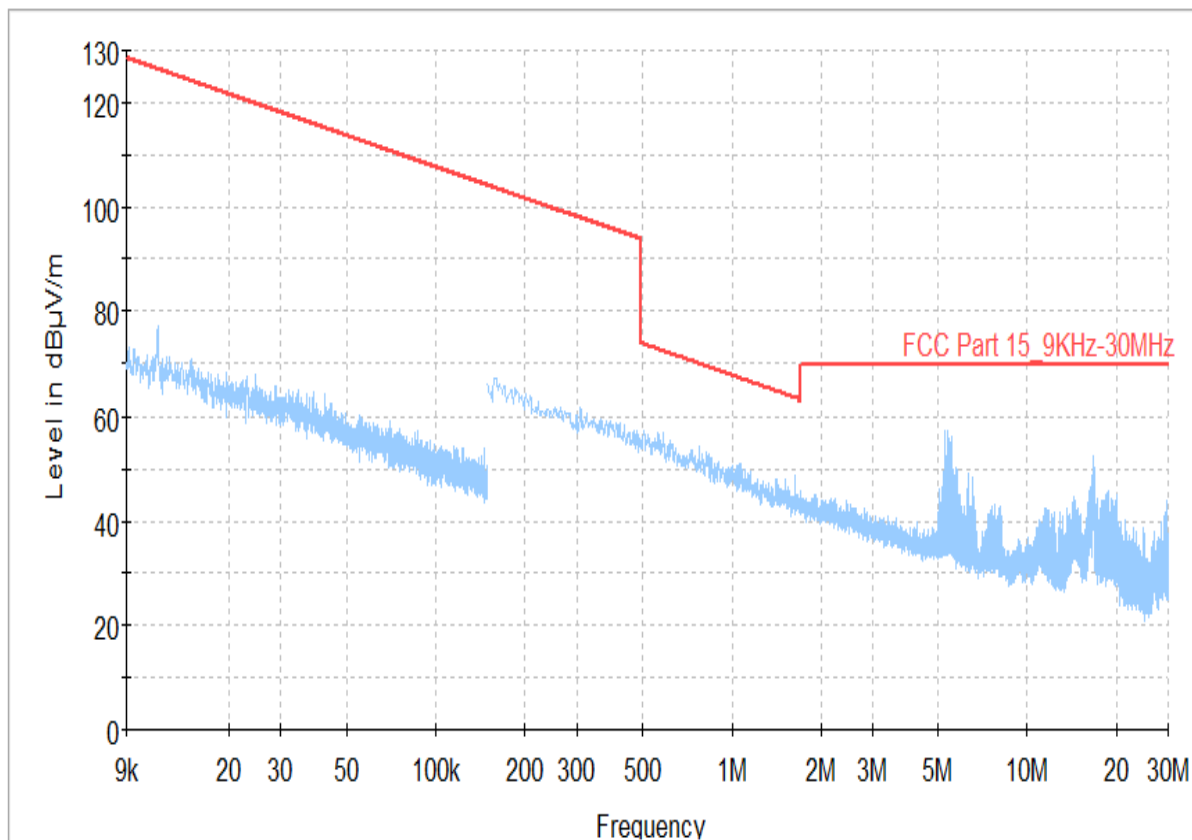
3.1 SPURIOUS RADIATED EMISSIONS

EUT Nomenclature	Wireless AV Base	Test Report No.	EMC0423-1
Model No.	WAV-CWL	Serial No.	106
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Test End Date	06-Jan-2020	Humidity RH (%)	55 ± 3
Tested By	Shaithanya C	Pressure (mbar)	NR
Input Voltage / Freq	3.3V, 22mA		
Operating Mode	Refer Page 5 Operating Modes Table		
Test configuration	Refer Page 5 Test Configuration Table		
Deviation from Std	NA		
Comment			
TEST FREQUENCY RANGE			
Start Frequency	9KHz	Stop Frequency	10GHz
MAXIMUM OPERATING FREQUENCY			
902MHz to 928MHz			
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Applicable standard	FCC Part 15.209	Test Method	KDB 558074
Equipment Class	NA	Measurement Distance	3m

TEST EQUIPMENT

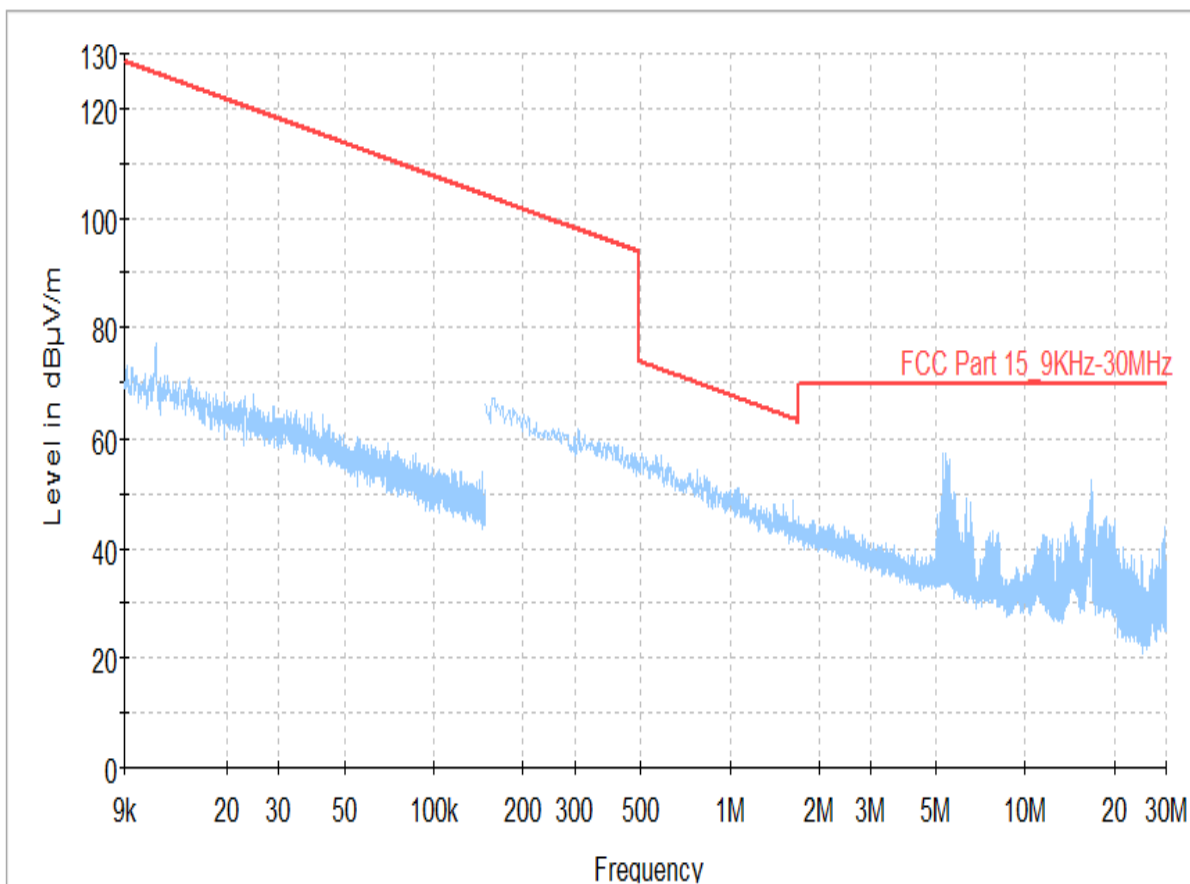
Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	EMI Test Receiver	R&S	ESU26	100229	7-Aug-20
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	30-Jul-22
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	64055	1-Nov-21
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	5-Nov-21
Y	Loop Antenna	ETS Lindgren	6507	103694	15-Nov-21
Y	RF cable (9KHz to 18GHz)	AH Systems	SAC-18G-06	RE-03	20-Feb-20
Y	Signal Conditioning unit	R&S	SCU-18	10178	5-Jun-20
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	24-Feb-20
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver					

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



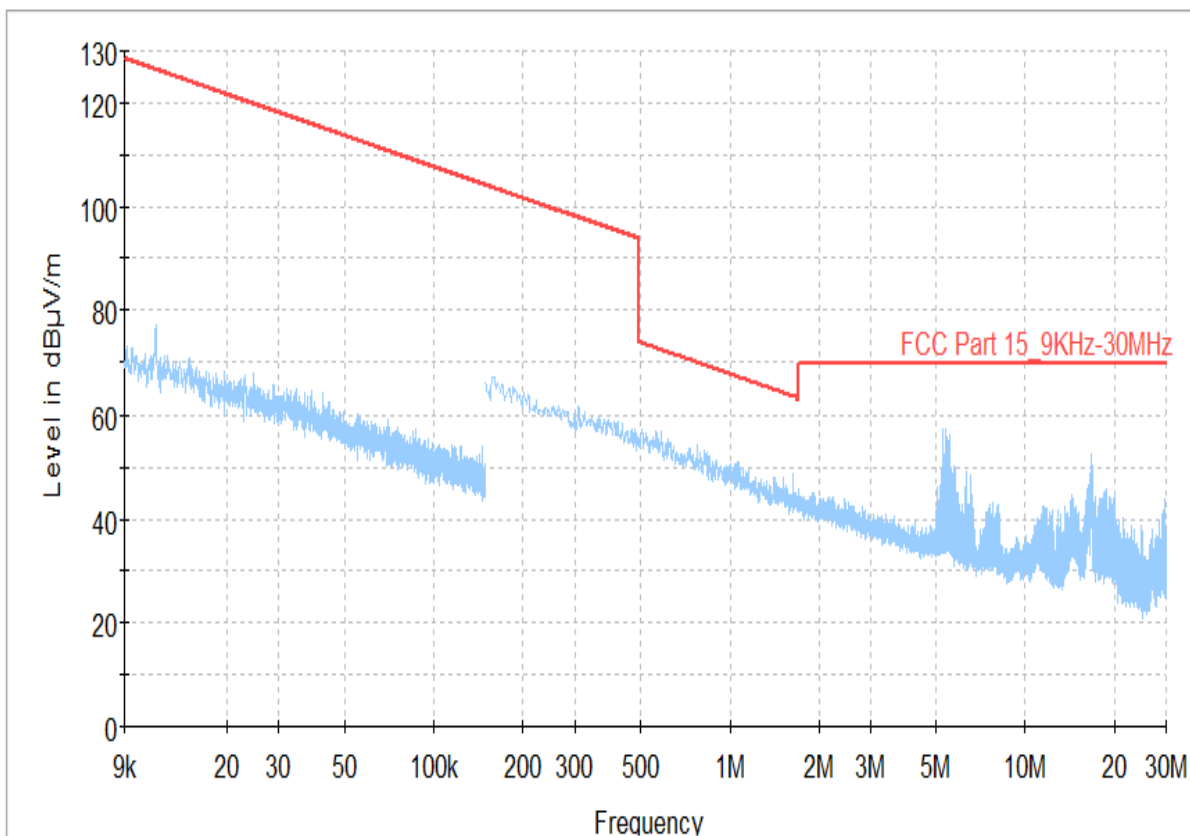
Channel 1 (902.875MHz) – Parallel

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



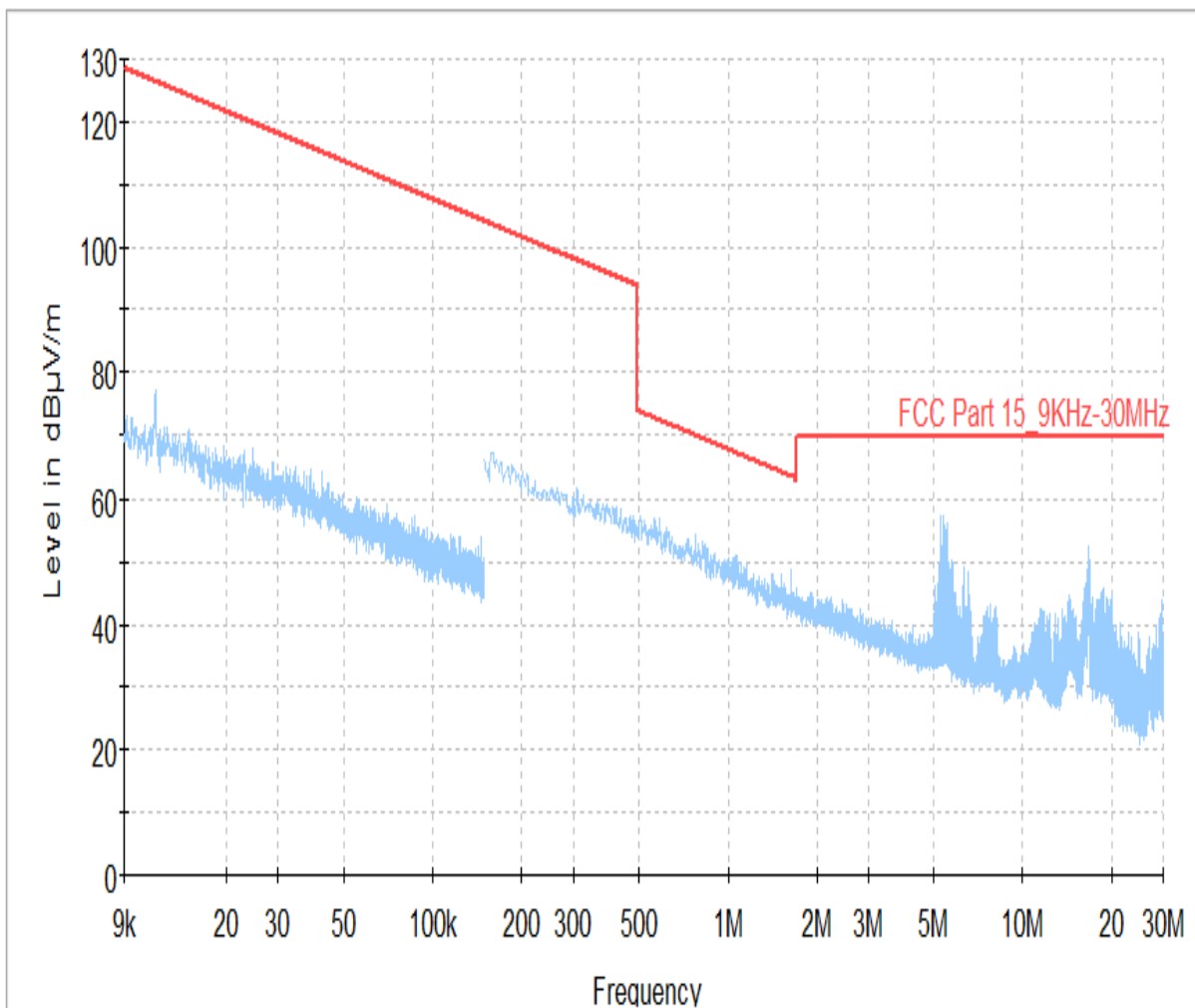
Channel 1 (902.875MHz) – Perpendicular

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



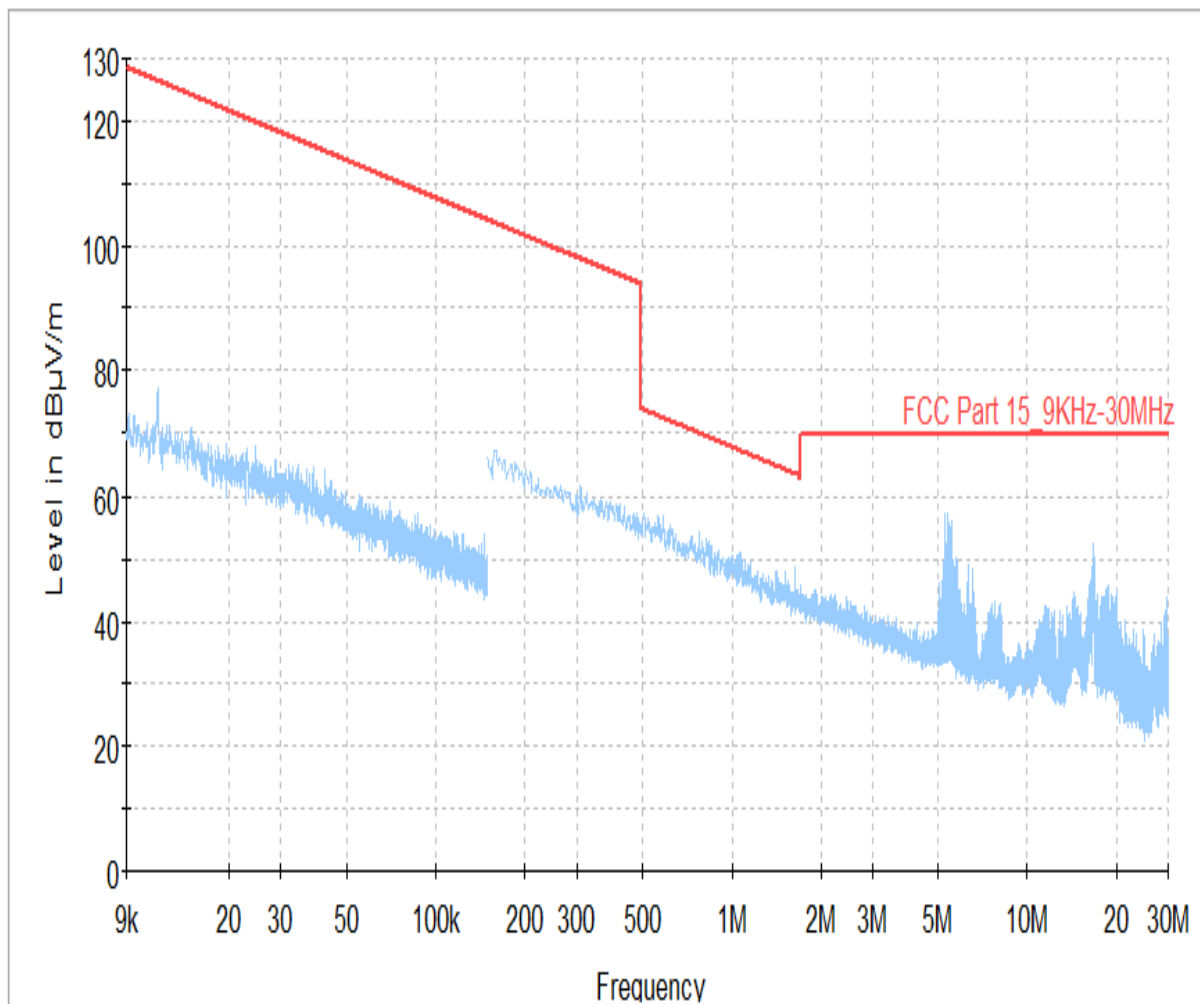
Channel 4 (915.325MHz) – Parallel

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



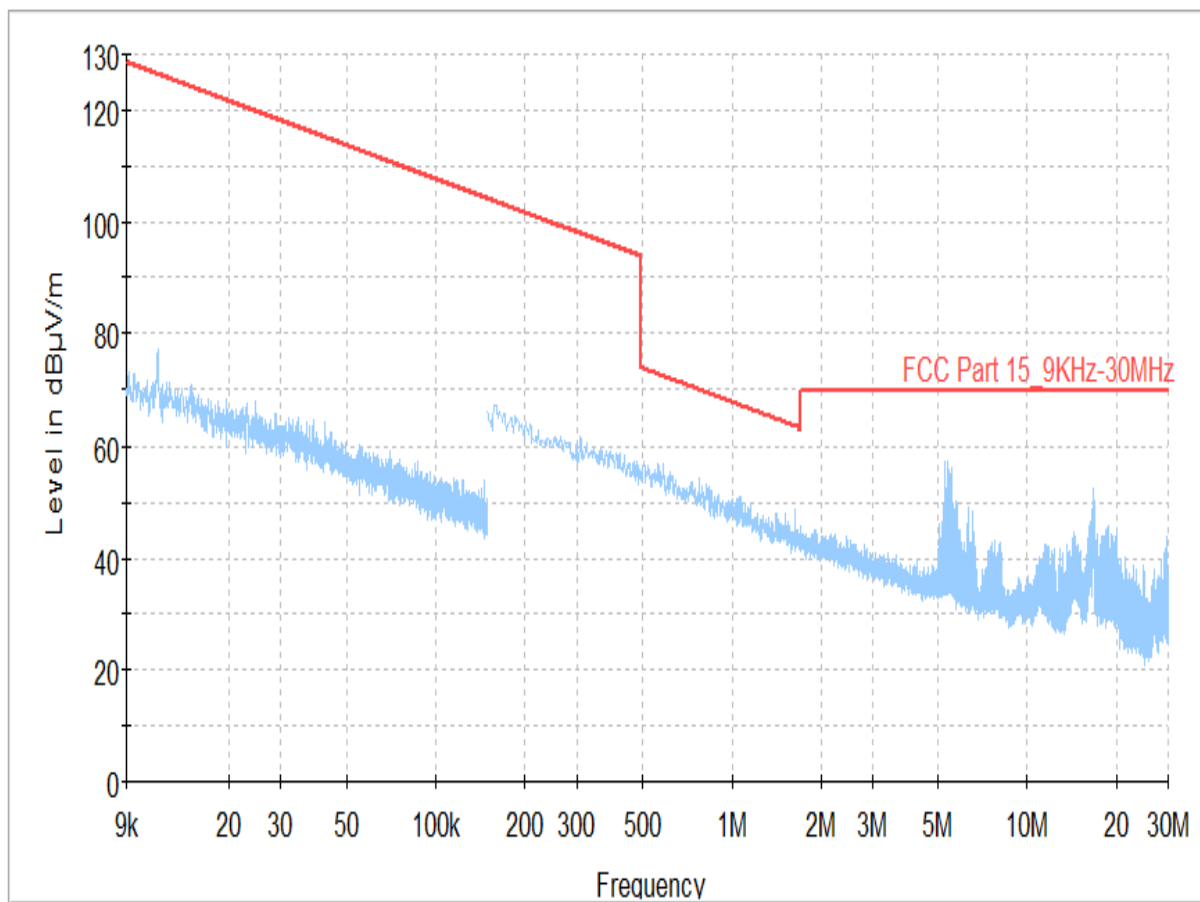
Channel 4 (915.325MHz) – Perpendicular

TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



Channel 6 (927.125MHz) – Parallel

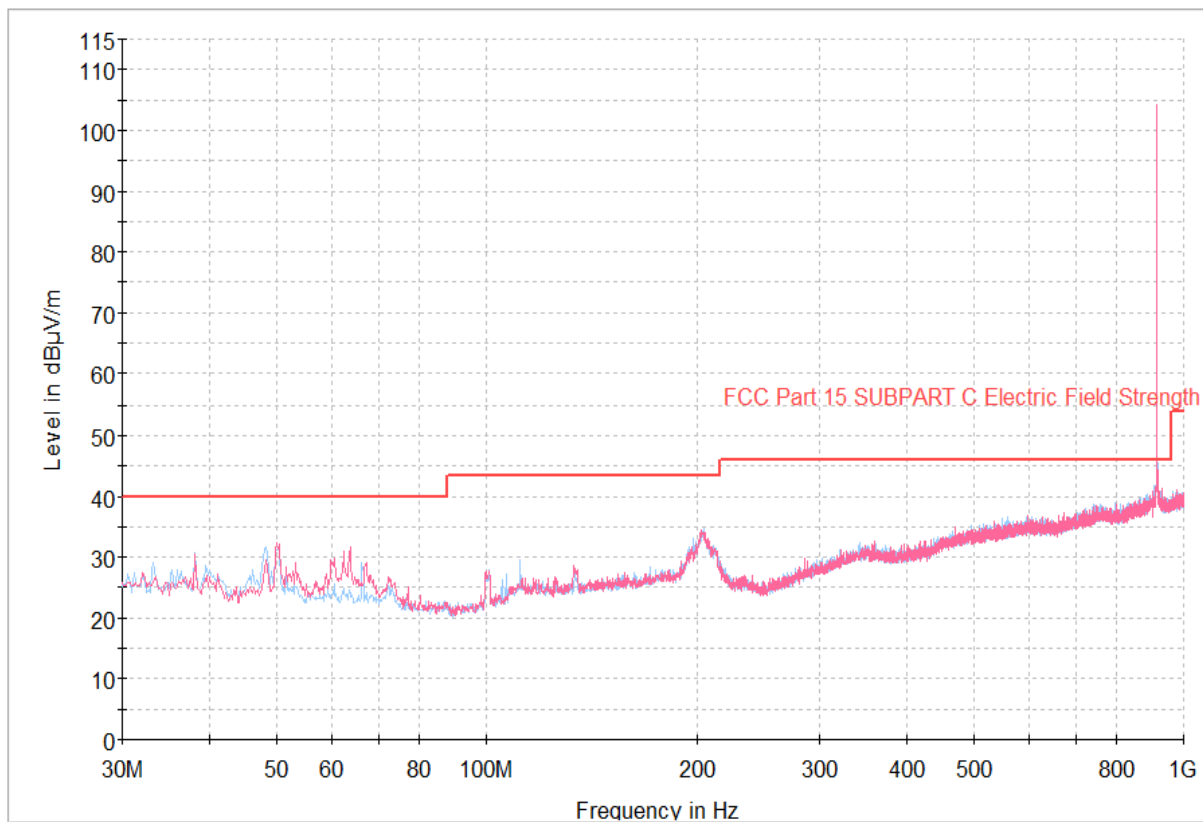
TEST GRAPHS – 9 KHz to 30 MHz (Antenna 1)



Channel 6 (927.125MHz) – Perpendicular

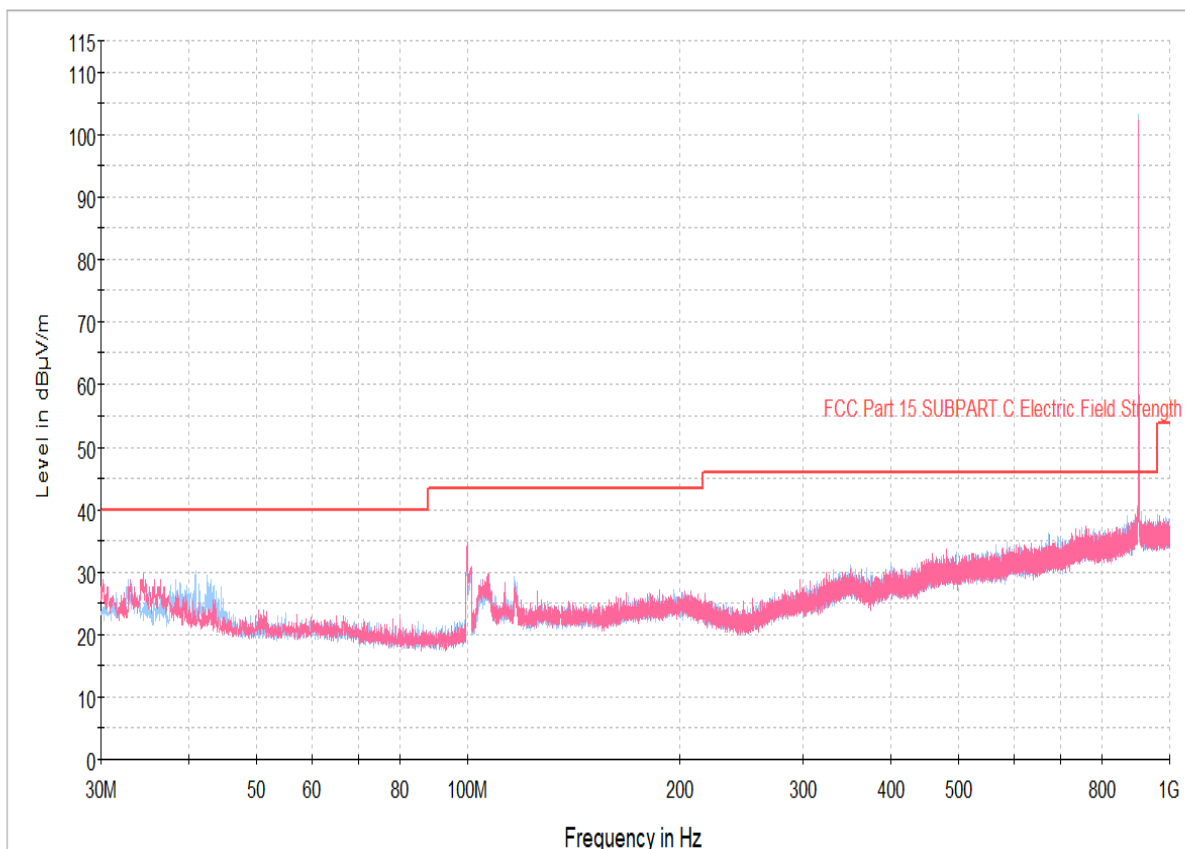
TEST RESULT – 9 KHz to 30 MHz									
Channel	Channel Frequency	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	MHz	dBµV/m	cm	Parallel / Perpendicular	deg	dB	dBµV/m	
No emissions detected that are a product of the transmitter. Emissions shown in the plot are related to the chamber ambient									
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



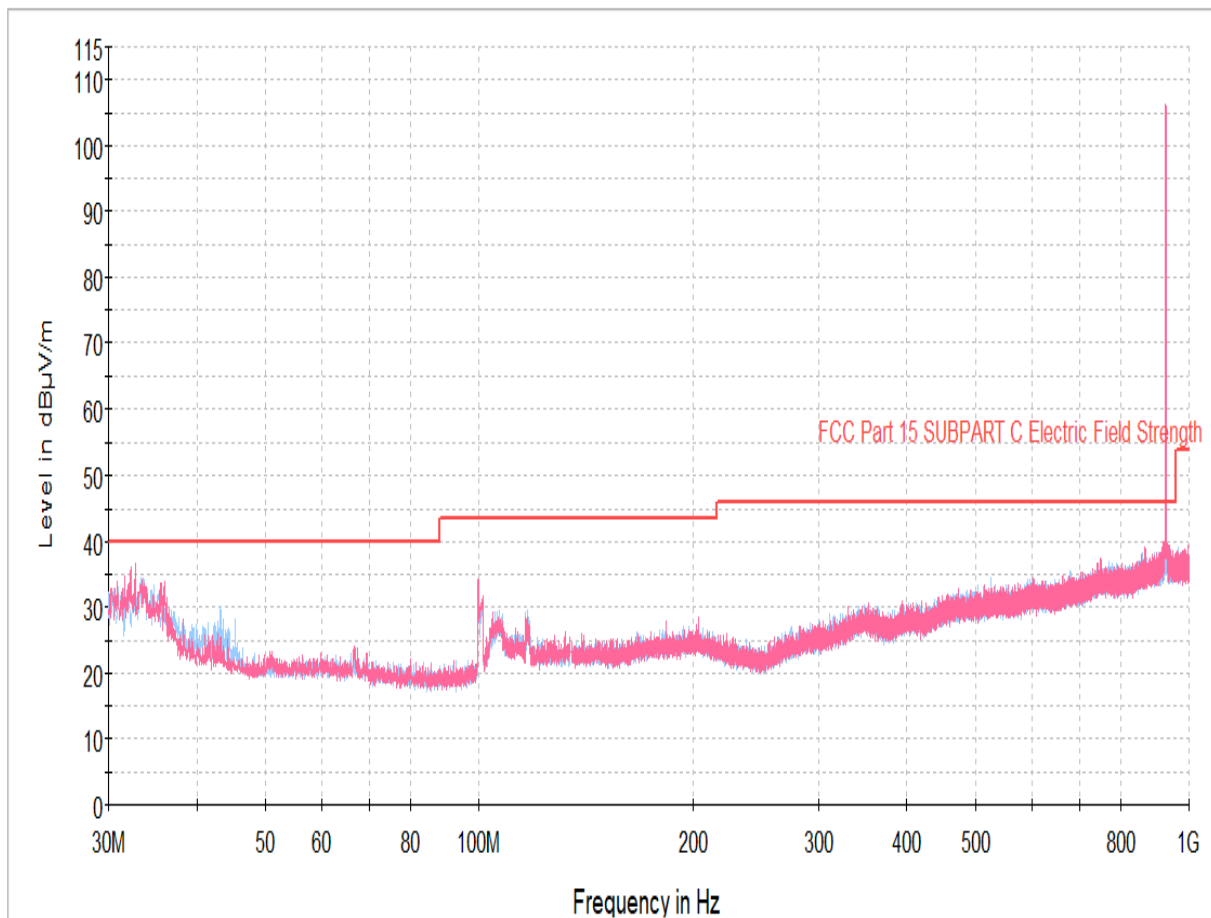
Channel 1 (902.875MHz) – Antenna 1

TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



Channel 4 (915.325MHz) – Antenna 1

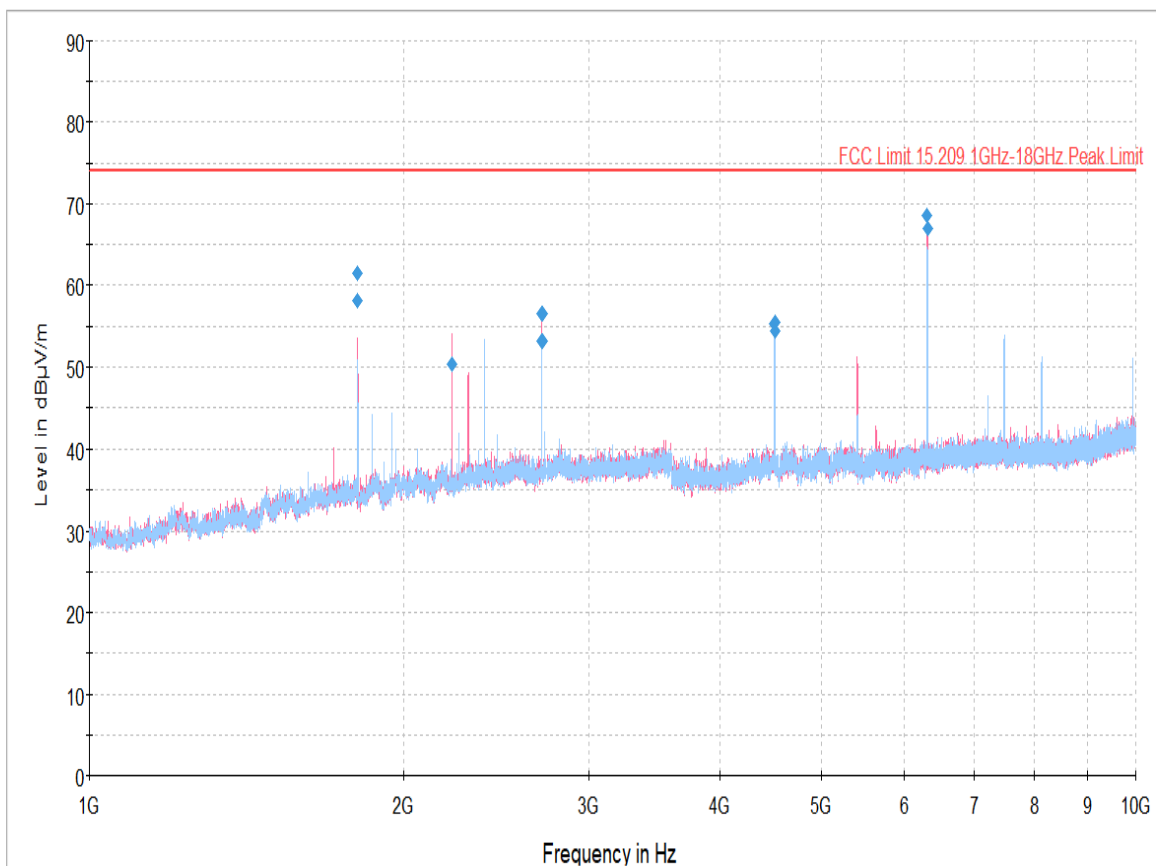
TEST GRAPHS – 30MHz to 1GHz (Antenna 1)



Channel 6 (927.125MHz) – Antenna 1

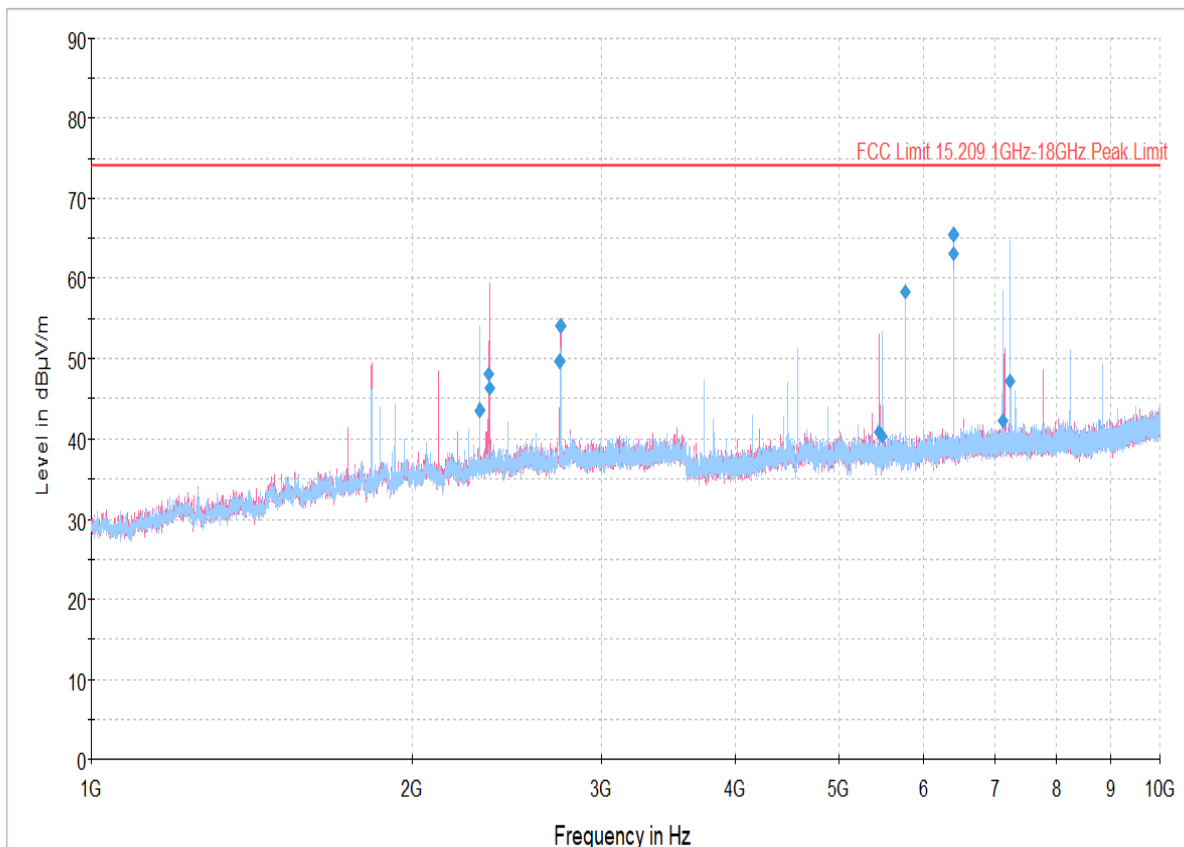
TEST RESULT – 30 MHz to 1 GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	Cm	H / V	deg	dB	dBµV/m	
Antenna – 1								
CH-1	455.05	27.81	400	H	286	18.19	46	Pass
CH-1	615.88	30.42	100	V	32	15.58	46	Pass
CH-1	822.49	32.54	200	H	271	13.46	46	Pass
CH-1	902.74	103.08	100	V	343	-	-	Intended Frequency
CH-4	673.89	30.5	100	V	286	15.5	46	Pass
CH-4	763.90	32.36	200	H	296	13.64	46	Pass
CH-4	797.85	32.04	100	H	49	13.96	46	Pass
CH-4	847.32	32.96	300	H	147	13.04	46	Pass
CH-4	901.45	34.65	200	V	141	11.35	46	Pass
CH-4	915.22	102.04	100	H	341	-	-	Intended Frequency
CH-6	691.54	30.95	100	H	174	15.05	46	Pass
CH-6	698.14	31.13	300	H	289	14.87	46	Pass
CH-6	832.77	32.64	400	V	154	13.36	46	Pass
CH-6	834.32	32.78	100	V	343	13.22	46	Pass
CH-6	838.98	32.85	100	H	269	13.15	46	Pass
CH-6	926.99	106.26	100	V	152	-	-	Intended Frequency
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



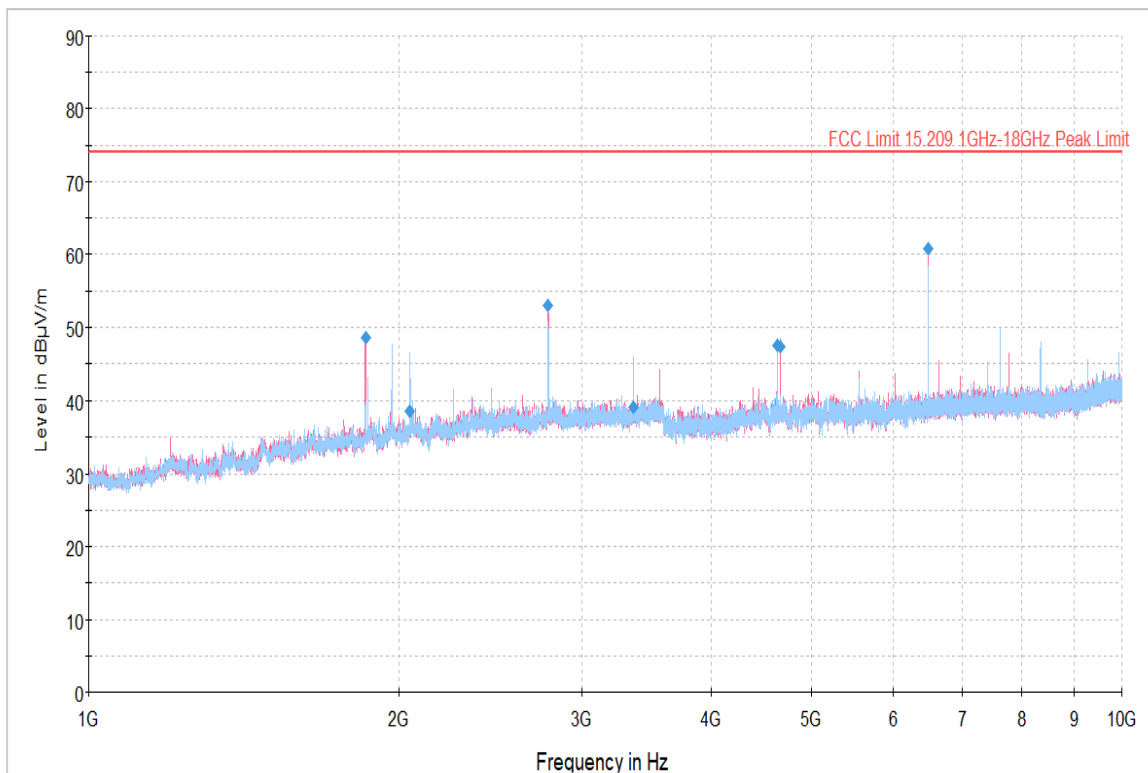
Channel 1 (902.875MHz) – Antenna 1

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



Channel 4 (915.325MHz) – Antenna 1

TEST GRAPHS – 1GHz to 10GHz (Antenna 1)



Channel 6 (927.125MHz) – Antenna 1

TEST RESULT – 1 GHz to 10 GHz					RESTRICTED BAND – PEAK			
Channel	Frequency	Measured MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit	Result
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)	
Antenna – 1								
CH-1	2221.43	50.28	400	V	0	23.72	74	PASS
CH-1	2707.43	53.2	100	V	336	20.8	74	PASS
CH-1	2709.36	56.44	100	V	325	17.56	74	PASS
CH-1	4512.89	55.33	300	H	116	18.67	74	PASS
CH-1	4514.18	54.4	300	H	116	19.6	74	PASS
CH-1	4515.79	55.47	300	H	116	18.53	74	PASS
CH-4	2311.43	43.63	100	H	299	30.37	74	PASS
CH-4	2358.68	47.96	100	V	50	26.04	74	PASS
CH-4	2359.64	46.31	100	V	50	27.69	74	PASS
CH-4	2744.71	49.58	100	V	335	24.42	74	PASS
CH-4	2746.64	54.06	100	V	313	19.94	74	PASS
CH-4	5454.68	40.91	100	V	33	33.09	74	PASS
CH-6	2780.39	52.95	100	V	319	21.05	74	PASS
CH-6	4636.64	47.46	100	H	301	26.54	74	PASS
CH-6	4671.36	47.29	300	V	253	26.71	74	PASS
Note :								
Measured Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)								

TEST RESULT – 1 GHz to 10 GHz					RESTRICTED BAND – AVERAGE			
Channel	Frequency	Measured Average	Height	Ant Pol	Azimuth	Margin	Limit	Result
#	(MHz)	(dBµV/m)	(cm)	H / V	(deg)	(dB)	(dBµV/m)	
Antenna – 1								
CH-1	2708.07	48.39	200	V	352	5.61	54	PASS
CH-1	2709.04	48.3	200	V	72	5.7	54	PASS
CH-1	4513.21	45.66	300	H	112	8.34	54	PASS
CH-1	4515.14	44.96	300	H	116	9.04	54	PASS
CH-4	2359.64	25.09	100	V	50	28.91	54	PASS
CH-4	2745.36	45.86	200	V	86	8.14	54	PASS
CH-4	2746.64	46.07	100	V	313	7.93	54	PASS
CH-6	2780.71	44.75	100	V	314	9.25	54	PASS
CH-6	4634.39	36.33	100	H	301	17.67	54	PASS
CH-6	4671.36	27.95	300	V	253	26.05	54	PASS
Note :								
Measured Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)								

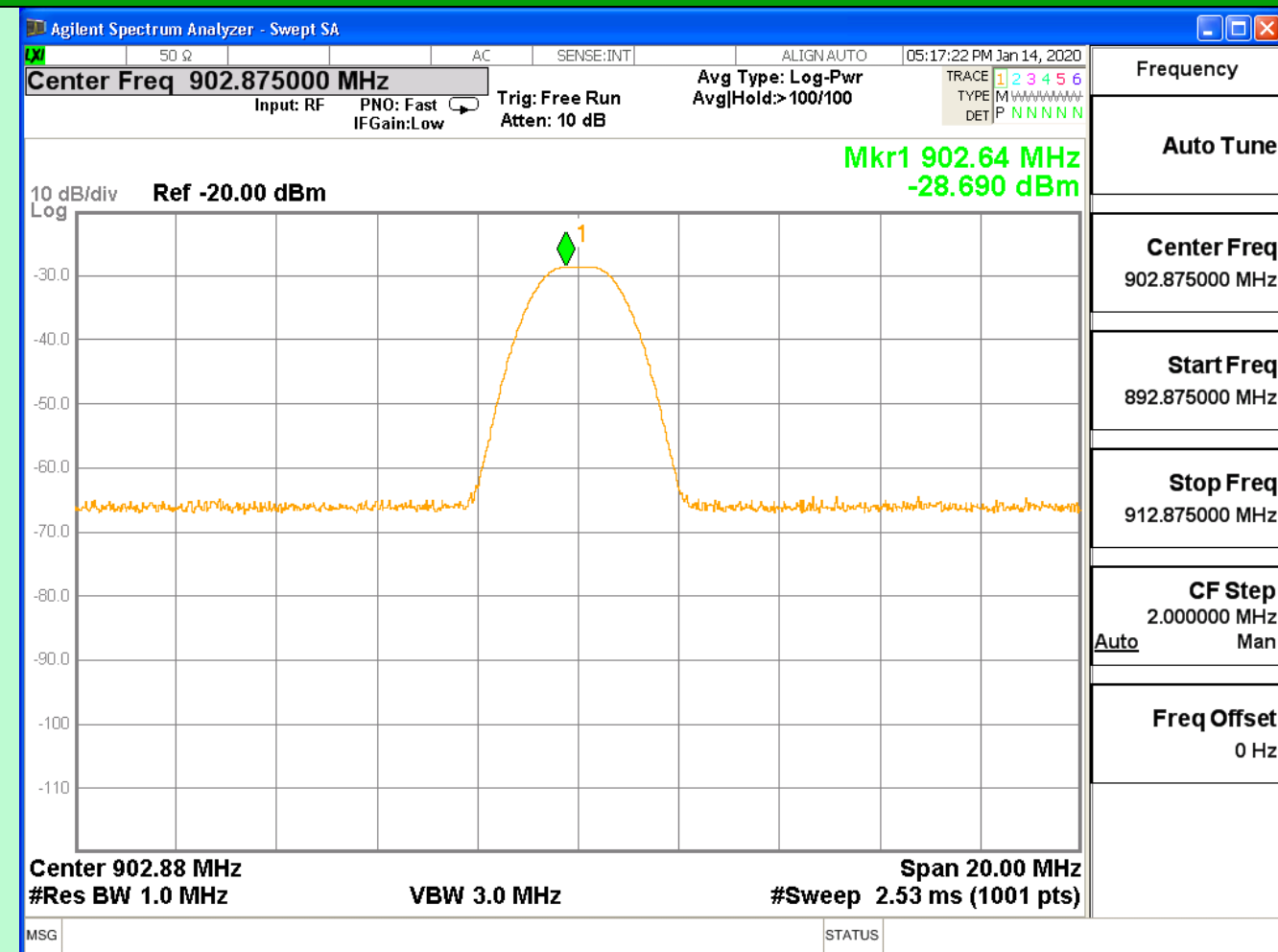
TEST RESULT – 1 GHz to 10 GHz					NON RESTRICTED BAND - PEAK				
Channel	Measured Fundamental	Frequency	Measured Peak field Strength	Height	Ant Pol	Azimuth	Peak Limit [Fundamental – 20 dB]	Margin	Results
#	dBμV/m	MHz	dBμV/m	cm	H / V	deg	dBuV/m	dB	
Antenna – 1									
CH-1	103.08	1805.50	61.5	400	V	20	83.08	21.58	PASS
CH-1	103.08	1806.14	58.11	400	V	25	83.08	24.97	PASS
CH-1	103.08	6318.36	68.54	200	V	14	83.08	14.54	PASS
CH-1	103.08	6319.32	66.91	200	V	14	83.08	16.17	PASS
CH-1	103.08	6321.57	66.93	200	V	9	83.08	16.15	PASS
CH-4	102.04	5498.71	40.42	200	H	299	82.04	41.62	PASS
CH-4	102.04	5771.93	58.21	100	H	0	82.04	23.83	PASS
CH-4	102.04	6405.14	65.6	300	V	288	82.04	16.44	PASS
CH-4	102.04	6408.36	63.03	300	V	299	82.04	19.01	PASS
CH-4	102.04	6409.00	65.33	300	V	288	82.04	16.71	PASS
CH-4	102.04	7124.18	42.29	300	H	288	82.04	39.75	PASS
CH-4	102.04	7237.00	47.14	400	H	295	82.04	34.9	PASS
CH-6	106.26	1854.36	48.57	400	V	14	86.26	37.69	PASS
CH-6	106.26	2045.93	38.63	200	H	106	86.26	47.63	PASS
CH-6	106.26	3365.39	39.1	400	H	223	86.26	47.16	PASS
CH-6	106.26	6491.93	60.69	400	V	300	86.26	25.57	PASS
Note :									
Measured Harmonic Field Strength (dBuV/m) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)									

3.2 EFFECTIVE ISOTROPIC RADIATED POWER			
EUT Nomenclature	Wireless AV Base	Test Request No.	EMC0423-1
Model No.	WAV-CWL	Serial No.	106
Test Start Date	14-Dec-2019	Temperature (°C)	23 ± 2
Test End Date	06-Jan-2020	Humidity RH (%)	55 ± 3
Tested By	Shaithanya C	Pressure (mbar)	NR
Input Voltage / Freq	3.3V, 22mA		
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 & 15.209 :2010		
Test Method	KDB 412172		
Comment	NA		
TEST DETAILS			
Method	☒ Radiated		☐ Conducted
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Equipment Class	NA	Measurement Distance	3m

TEST EQUIPMENT					
Y/N	Equipment	Make	Model	Sl. No.	Cal Due Date
Y	EMI Test Receiver	R&S	ESU26	100525	7-Aug-20
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	30-Jul-22
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	5-Nov-21
Y	RF cable (9KHz to 1GHz)	AH System	SAC-18G-06	RE-03	20-Feb-20

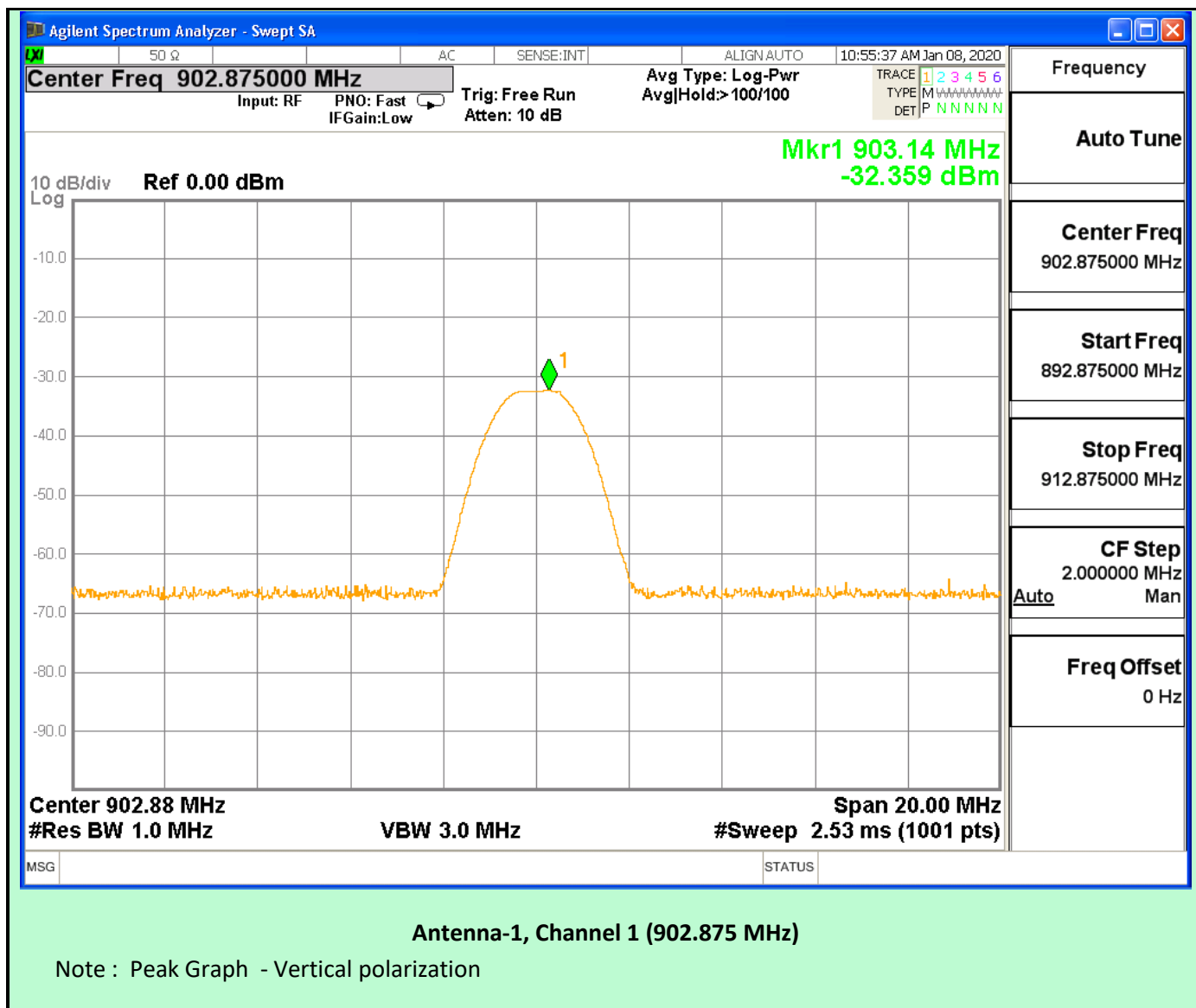
Note: Switch ON /OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – EIRP

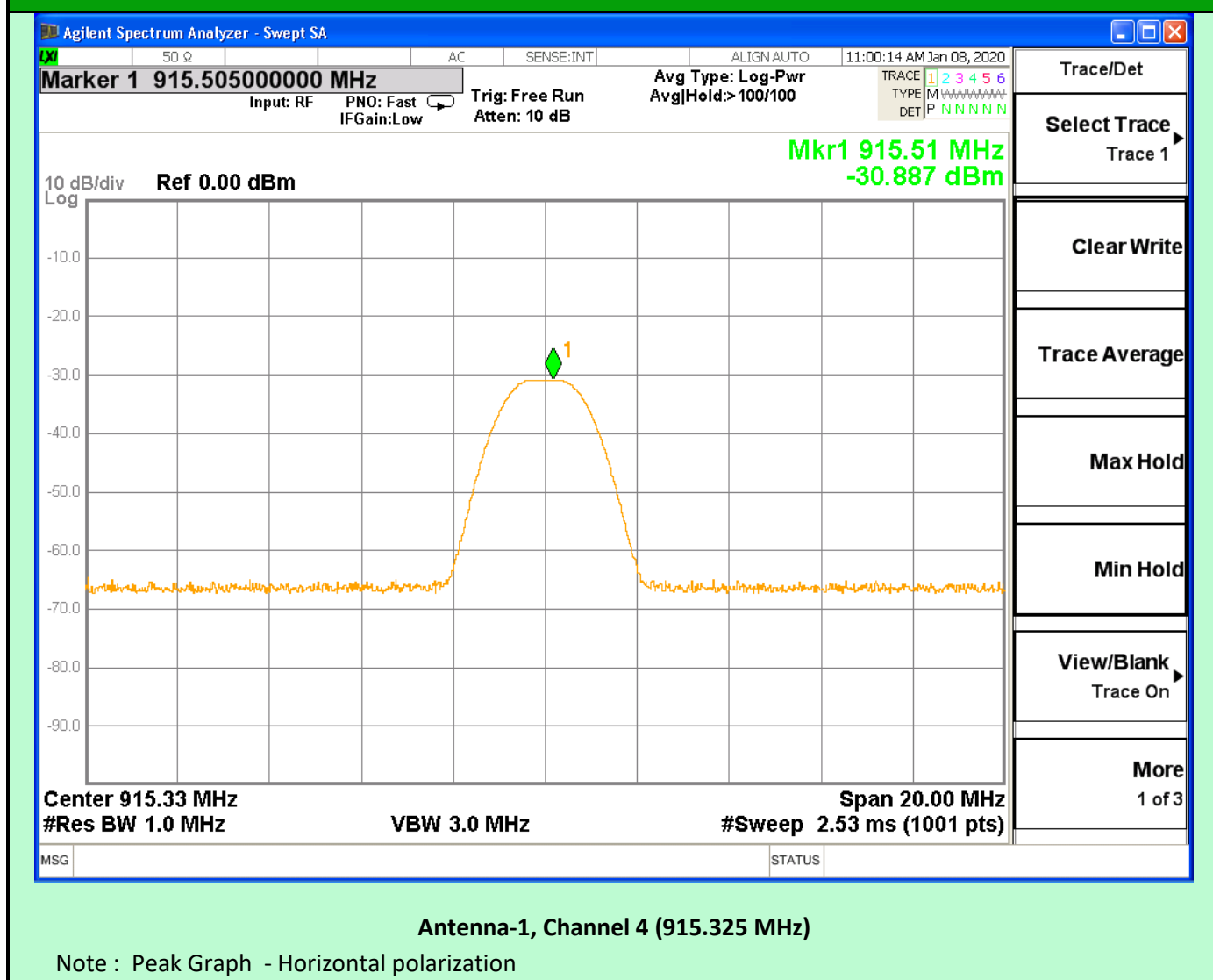


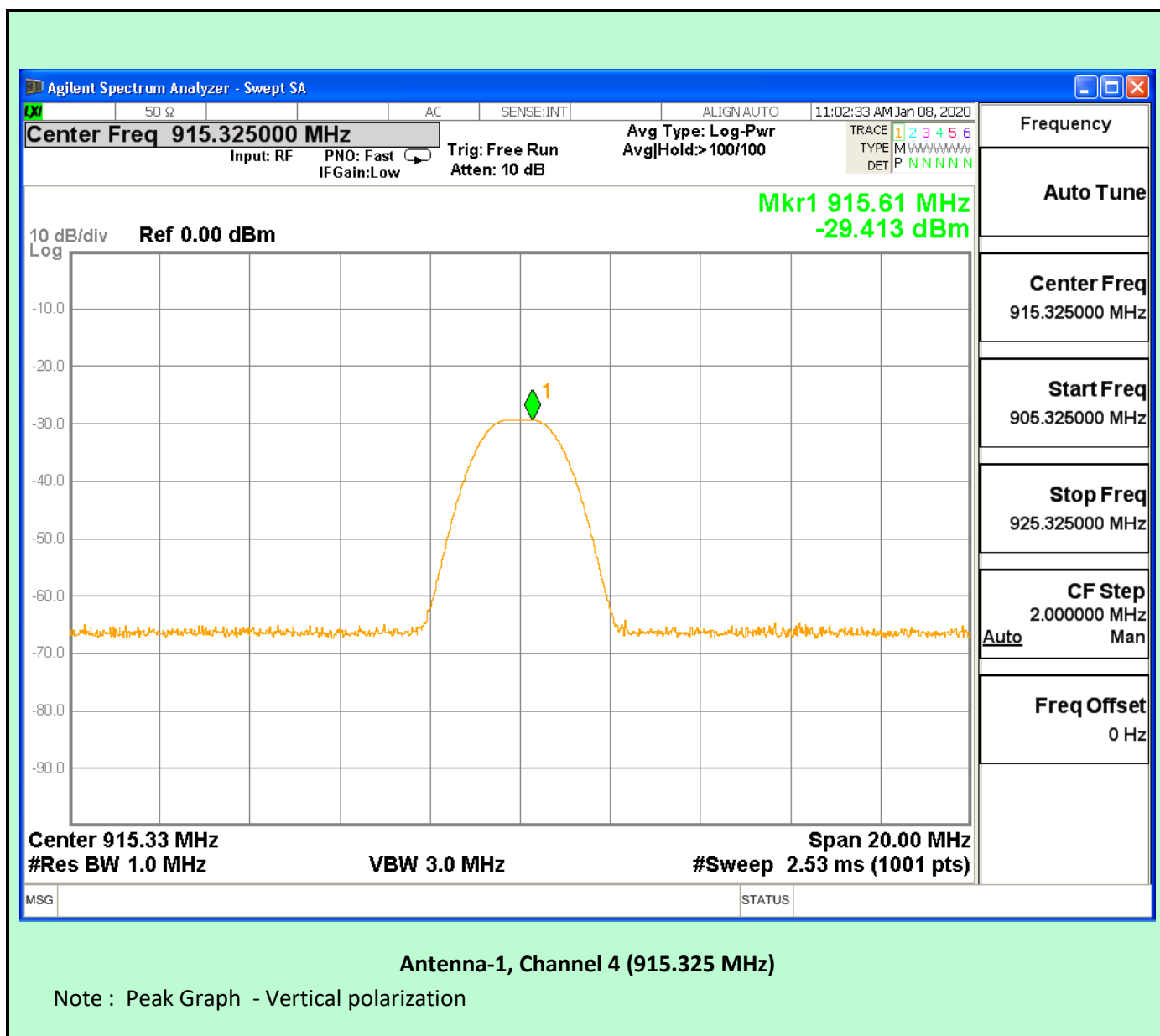
Antenna-1, Channel 1 (902.875 MHz)

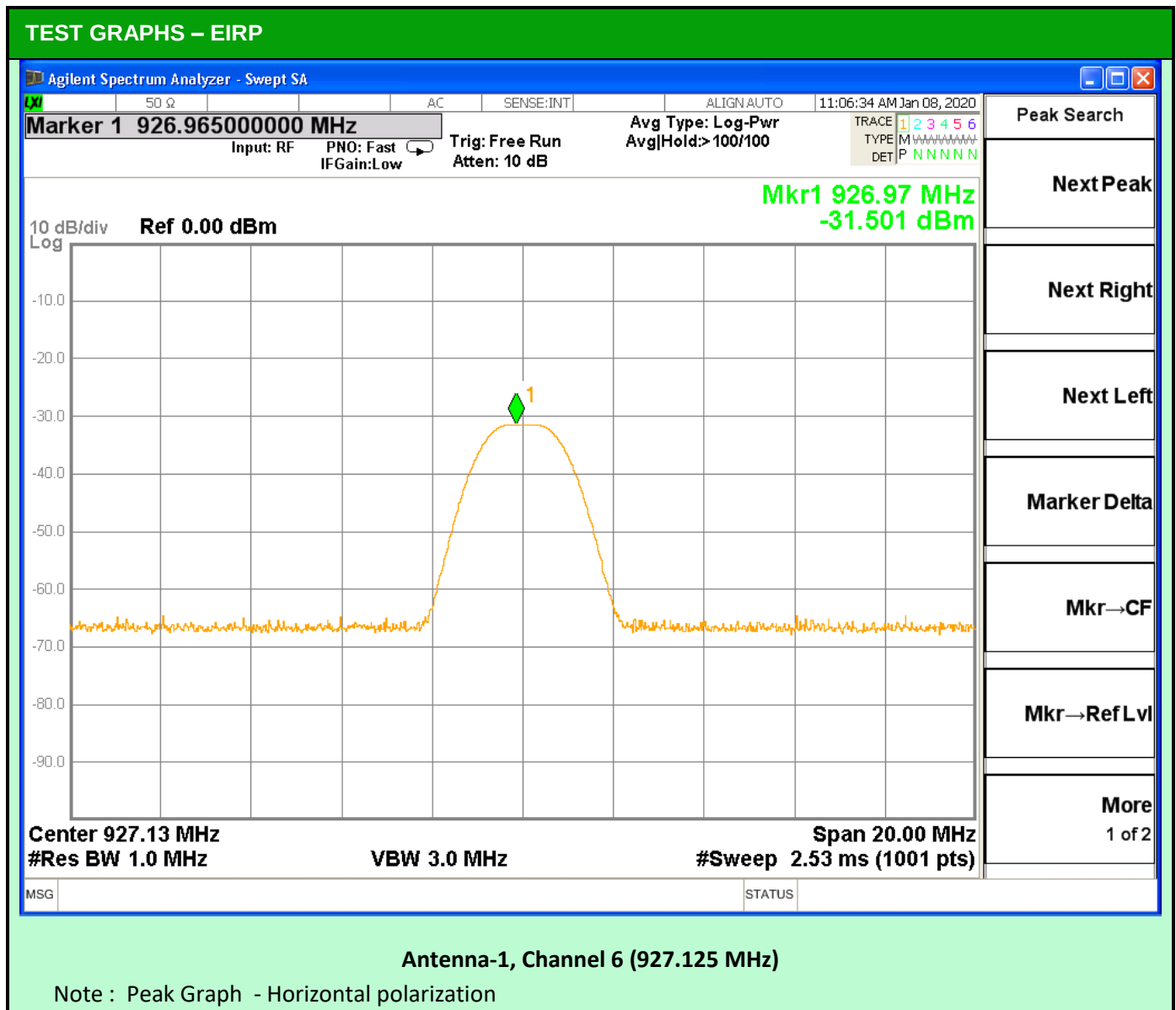
Note : Peak Graph - Horizontal polarization

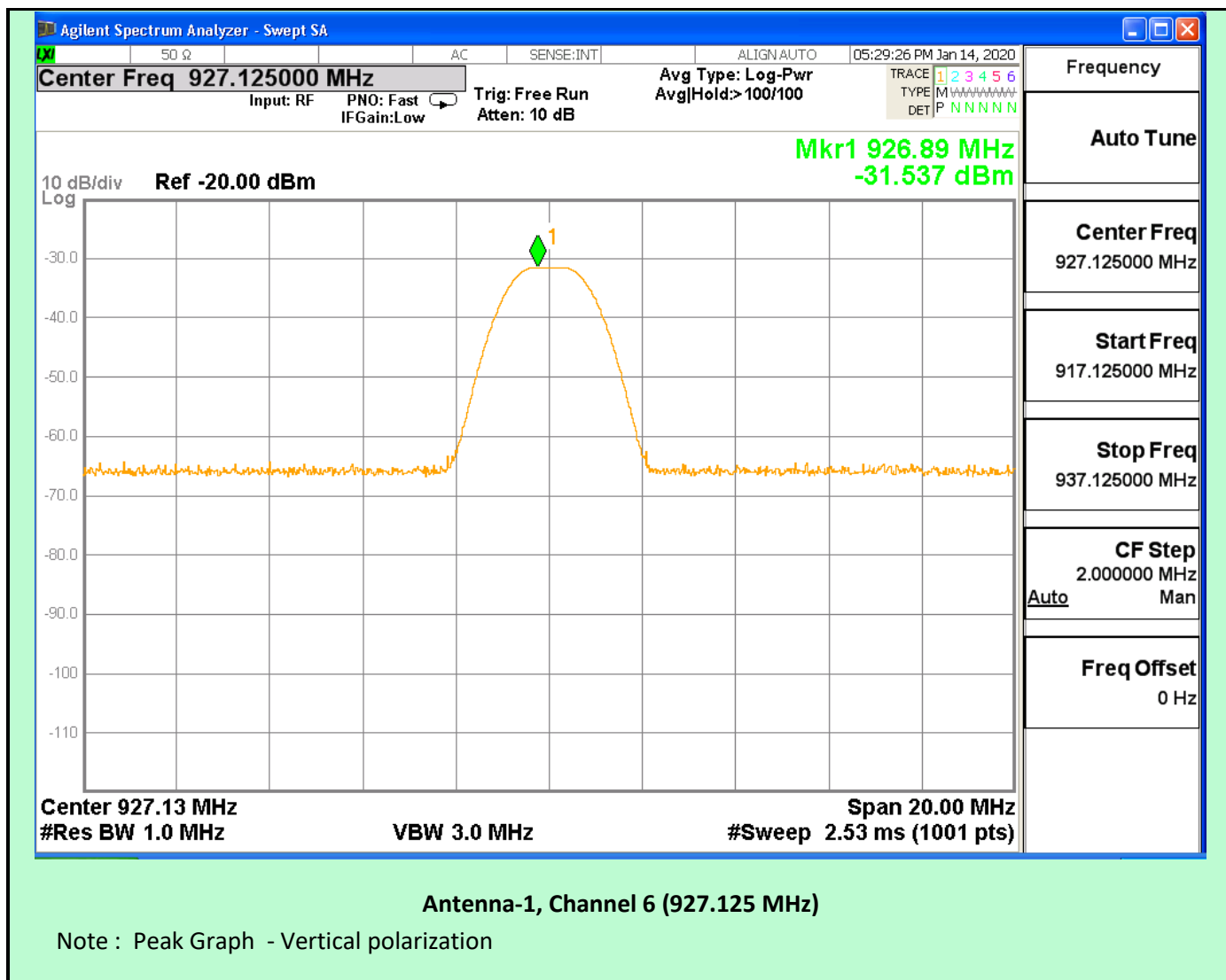


TEST GRAPHS – EIRP









TEST RESULT – EIRP

Channel	Channel Freq	Rx Antenna Height	Rx Ant Pol	Measured Level	Cable Loss	External Att	Path loss @ 3m	Rx Antenna Gain	Calculated Rx Power	Calculated EIRP
#	MHz	cm	H/V	dBm	dB	dB	dB	dBi	dBm	dBm
Antenna – 1 (DTS Mode)										
CH-1	902.875	100	H	-28.69	2.91	6	41.21	6.3	-26.08	15.13
CH-1	902.875	100	V	-32.35	2.91	6	41.21	6.3	-29.74	11.47
CH-4	915.325	200	H	-30.88	2.91	6	41.21	6.3	-28.27	12.94
CH-4	915.325	150	V	-29.41	2.91	6	41.21	6.3	-26.8	14.41
CH-6	927.125	200	H	-31.5	2.91	6	41.21	6.3	-28.89	12.32
CH-6	927.125	100	V	-31.53	2.91	6	41.21	6.3	-28.92	12.29

Note : Effective Isotropic Radiated Power (dBm)= Pr(dBm) +Lp(dB)

$$Pr = P_{meas}(dBm) - Gr(dBi) + Lc(dB) + Latt(dB)$$

$$Lp = 20 \log F + 20 \log D - 27.5$$

Where:

Pr = Calculated Received Power Level(dBm)

Lp= Free Space Path Loss(dB)

Pmeas= Measured Power Level(dBm)

Gr = Receiver Antenna Gain(dBi)

Lc = Cable Loss (dB)

Latt= External Attenuator(dB)

F = Frequency (MHz)

D= Distance (m)

Annexure – 1

RADIATED EMISSION SETUP**Radiated Emission Setup – 9 KHz to 30 MHz [Parallel]****Radiated Emission Setup – 9 KHz to 30 MHz [Perpendicular]**



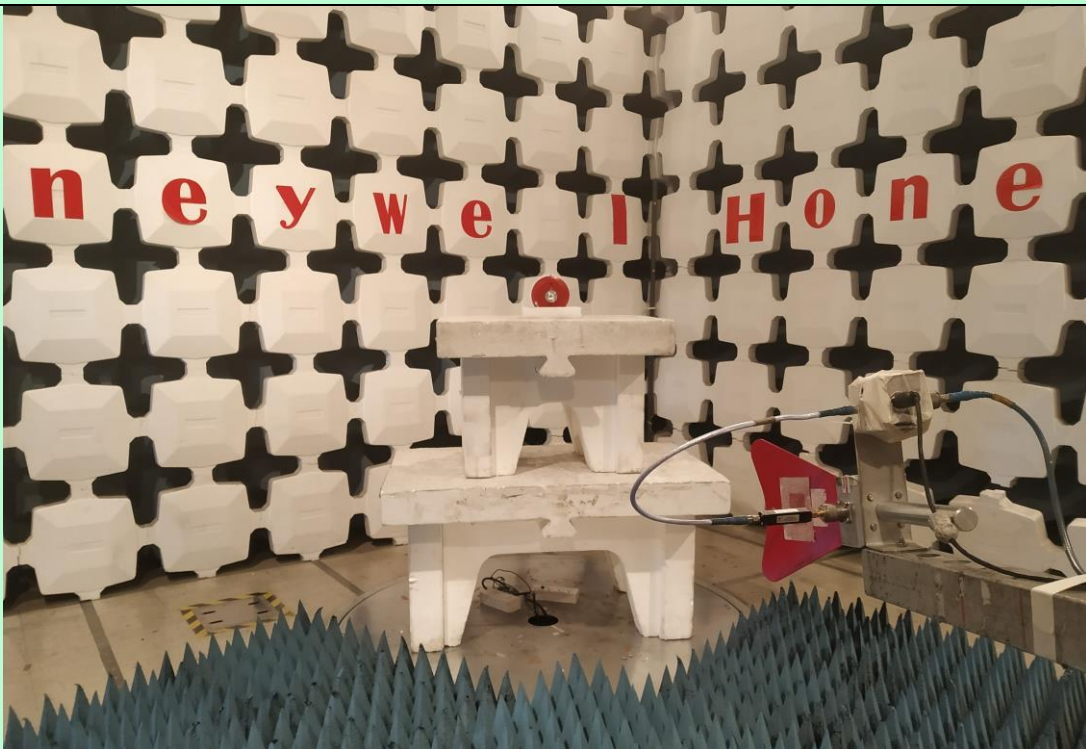
Radiated Emission Setup –30 MHz to 1 GHz [Horizontal Polarization]



Radiated Emission Setup –30 MHz to 1 GHz [Vertical Polarization]



Radiated Emission Setup –1 GHz to 10 GHz [Vertical Polarization]



Radiated Emission Setup –1 GHz to 10 GHz [Horizontal Polarization]