

3.5 SPURIOUS RADIATED EMISSIONS

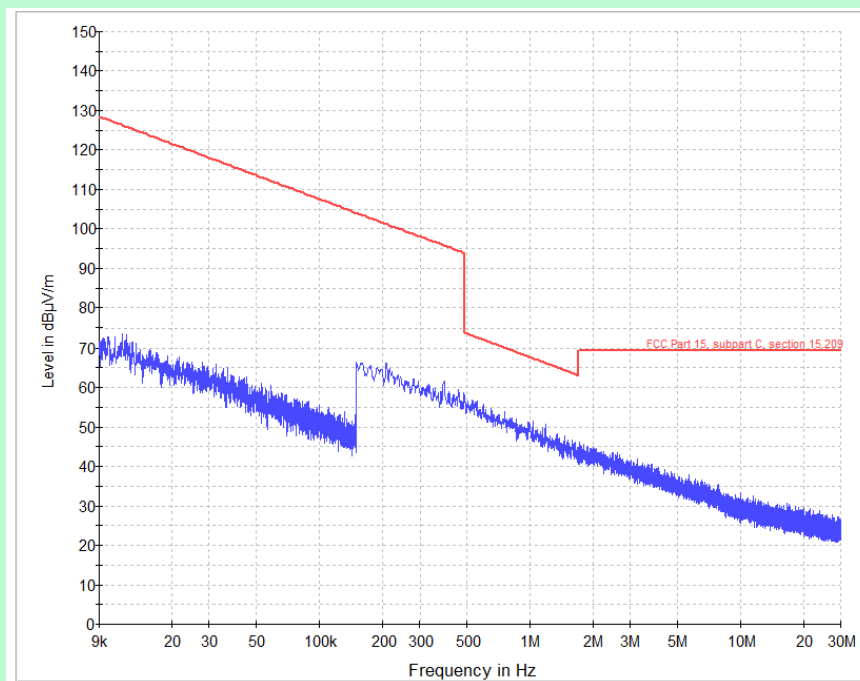
EUT Nomenclature	Wireless Smoke Detector	Test Report No.	EMC-0004-1
Model No.	FWD-200A CCLIMATE	Serial No.	01
Test Start Date	22-Oct-2013	Temperature (°C)	23.5
Test End Date	14-Dec-2013	Humidity RH (%)	57.1
Tested By	Gulshan Kumar	Pressure (mbar)	NR
Input Voltage / Freq	3.3Vdc		
Operating Mode	Refer 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	04-Feb-2014
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	31-Dec-2013
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	00064055	07-Nov-2013
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	30-Nov-2013
Y	Loop Antenna	ETS Lindgren	6507	000103694	12-Mar-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1A	09-May-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1B	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2A	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2B	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	09-May-2014
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

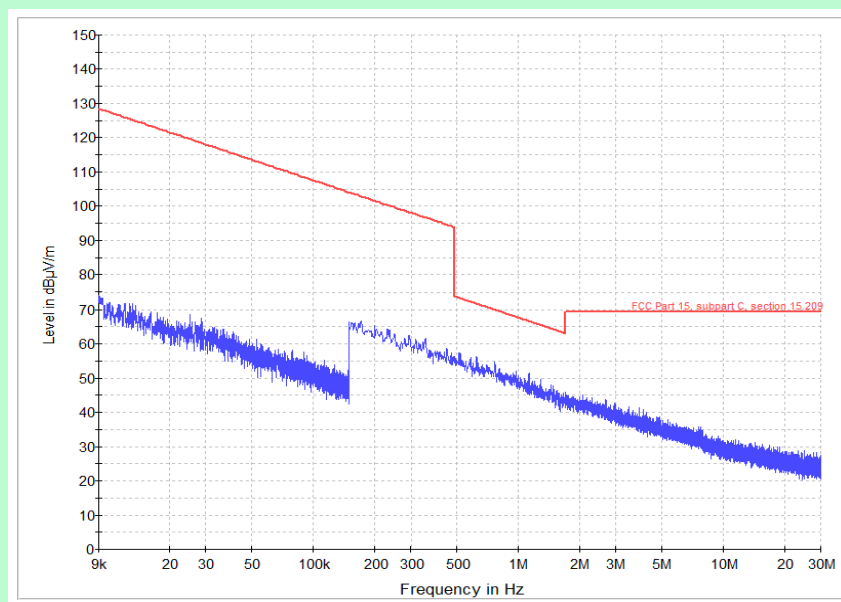
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – 9 KHz to 30 MHz



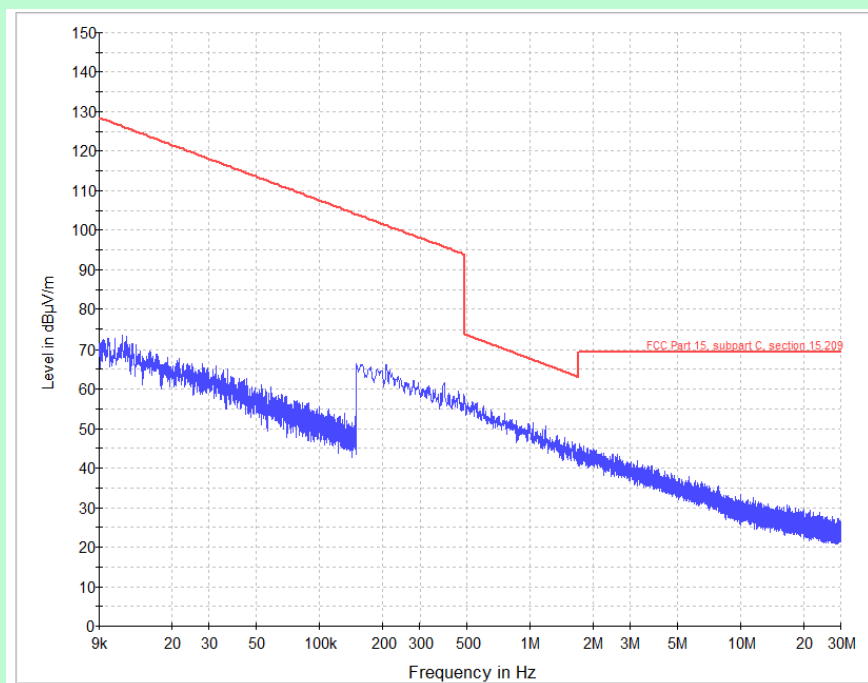
Channel 1 (902.875 MHz)

Note : Peak Graph - Parallel

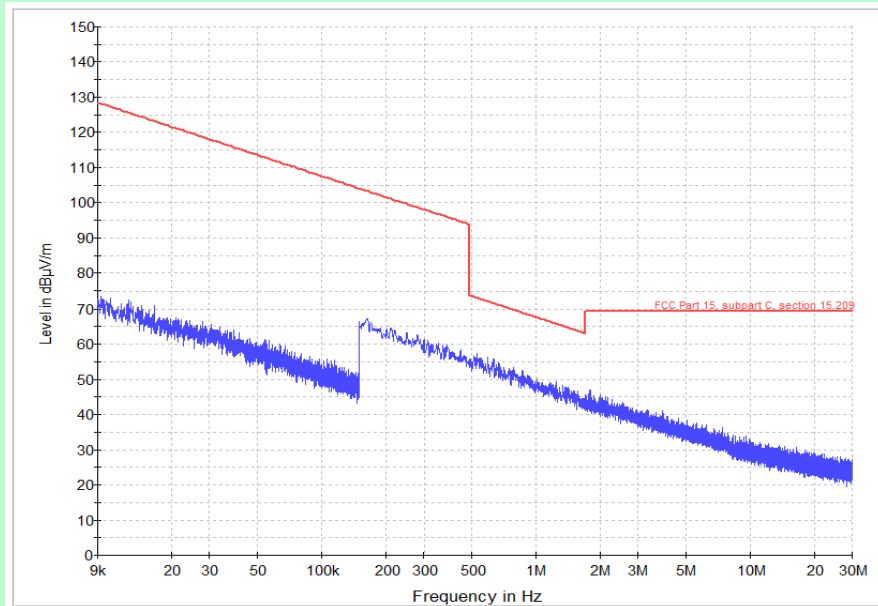


Channel 1 (902.875 MHz)

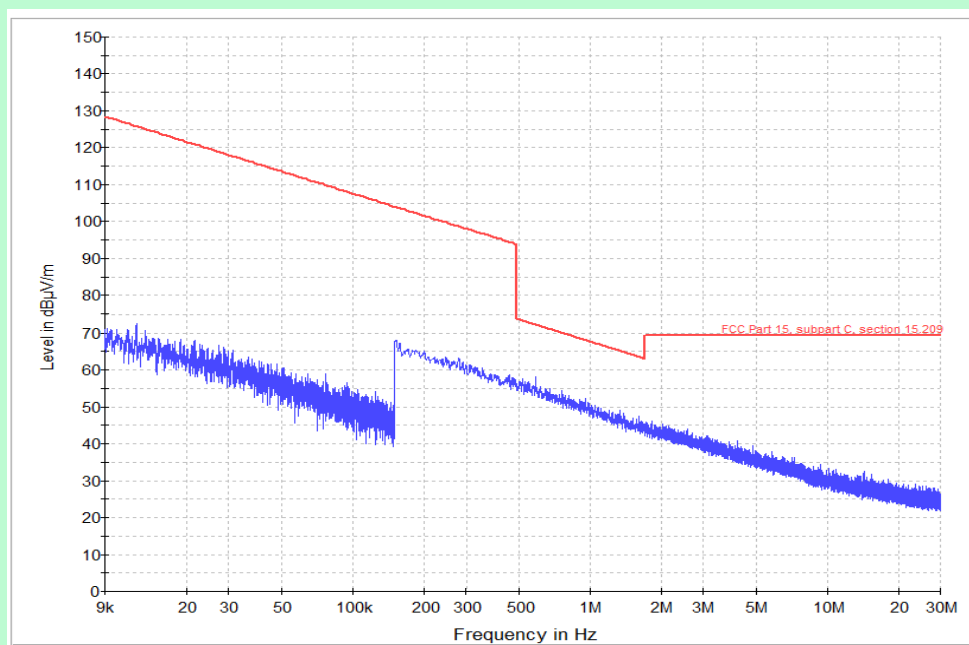
Note : Peak Graph - Perpendicular

**Channel 2 (908.425 MHz)**

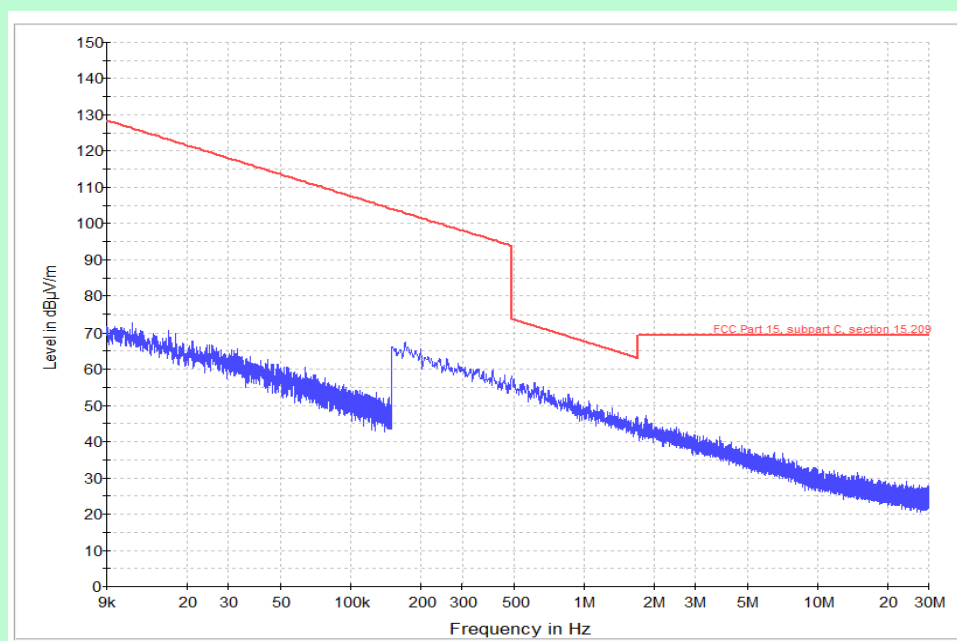
Note : Peak Graph - Parallel

**Channel 2 (908.425 MHz)**

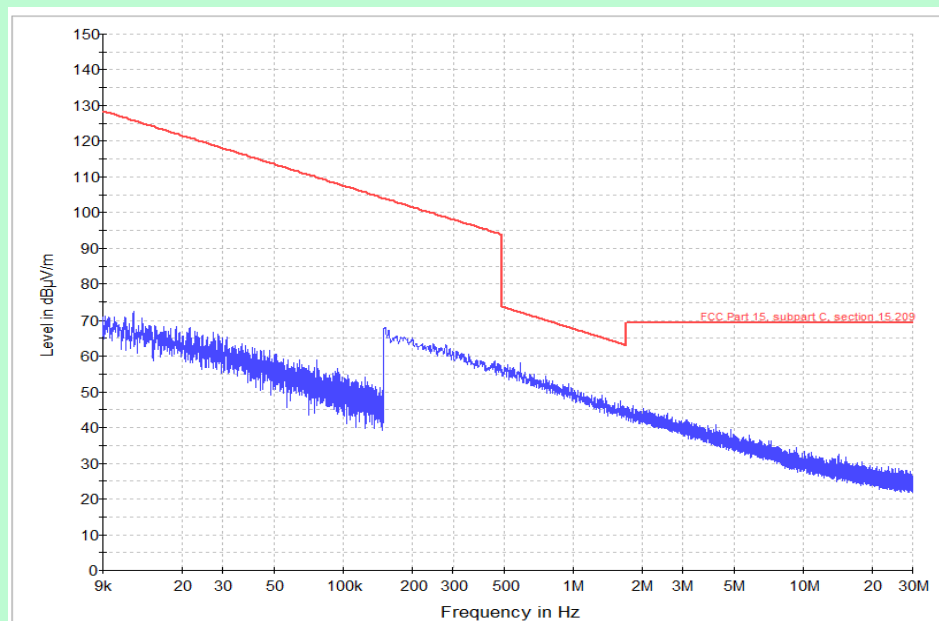
Note : Peak Graph - Perpendicular

**Channel 3 (914.325 MHz)**

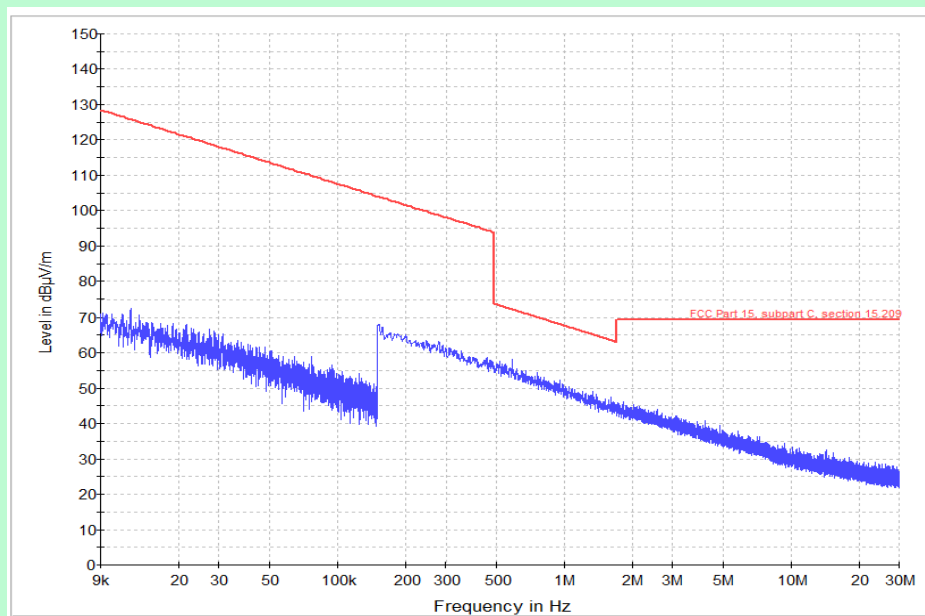
Note : Peak Graph - Parallel

**Channel 3 (914.325 MHz)**

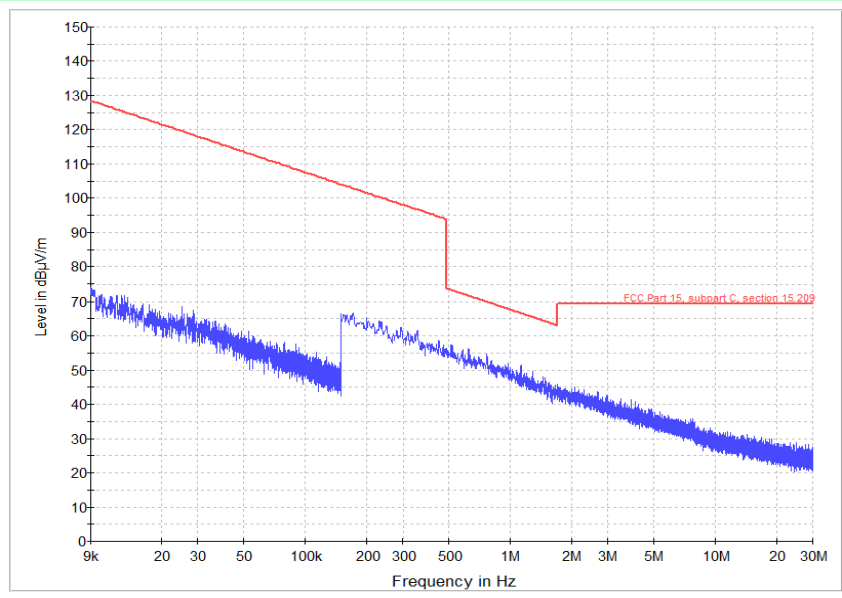
Note : Peak Graph - Perpendicular

**Channel 4 (915.325 MHz)**

Note : Peak Graph - Parallel

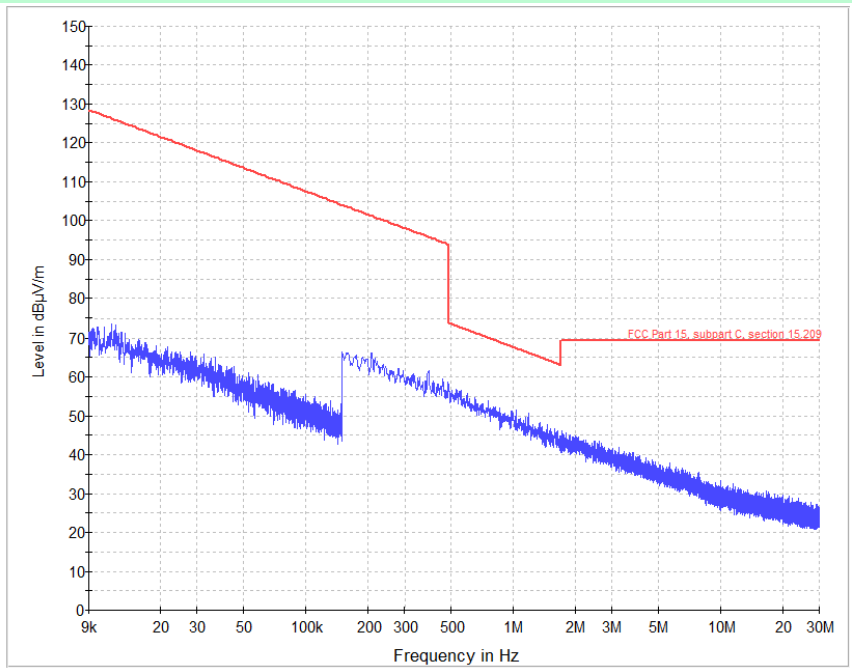
**Channel 4 (915.325 MHz)**

Note : Peak Graph - Perpendicular



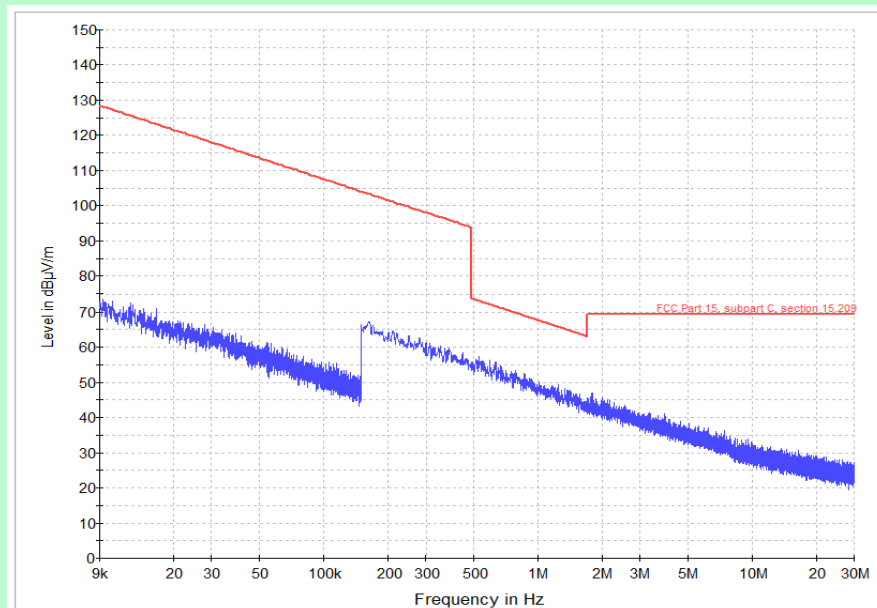
Channel 5 (921.575 MHz)

Note : Peak Graph - Perpendicular

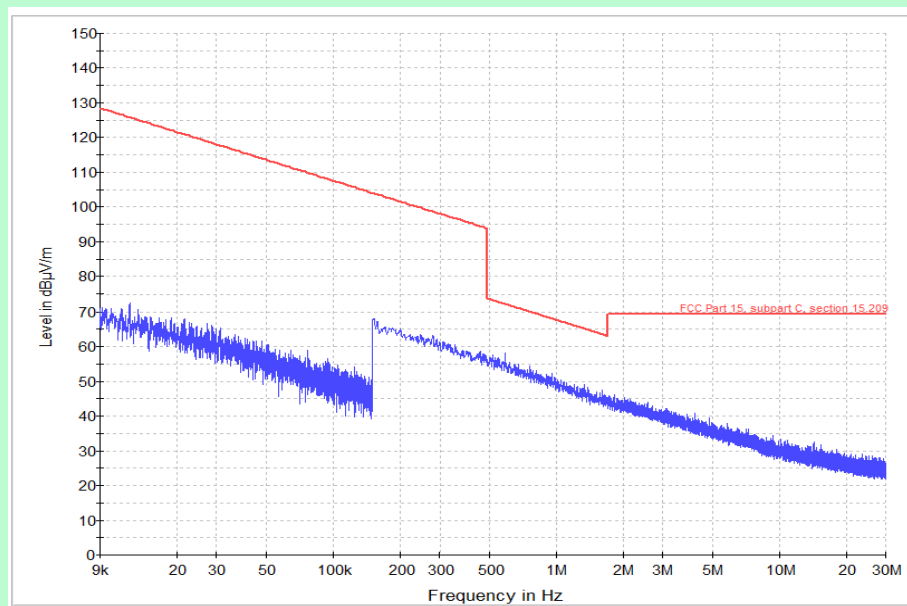


Channel 5 (921.575 MHz)

Note : Peak Graph - Parallel

**Channel 6 (927.125 MHz)**

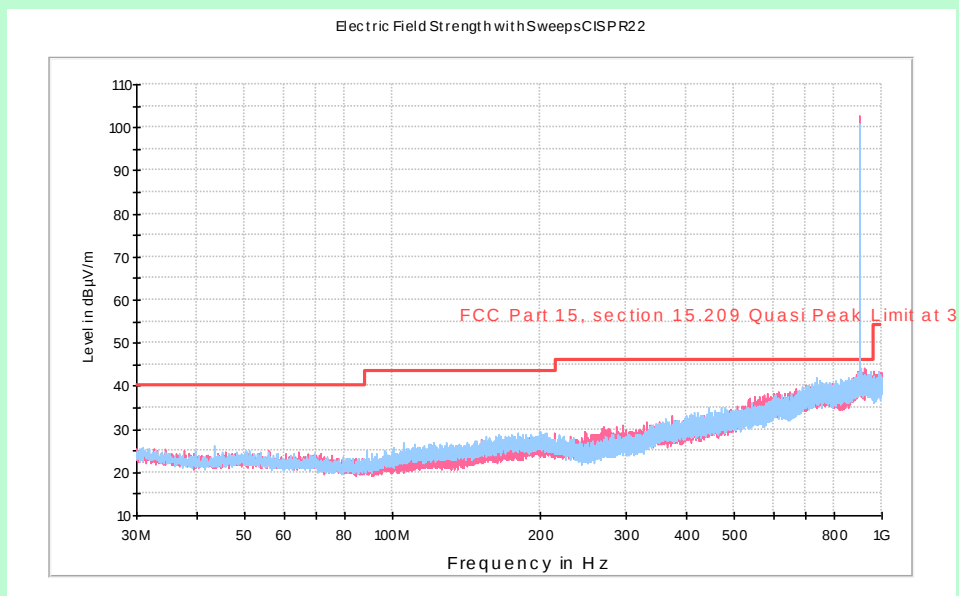
Note : Peak Graph - Perpendicular

**Channel 6 (927.125 MHz)**

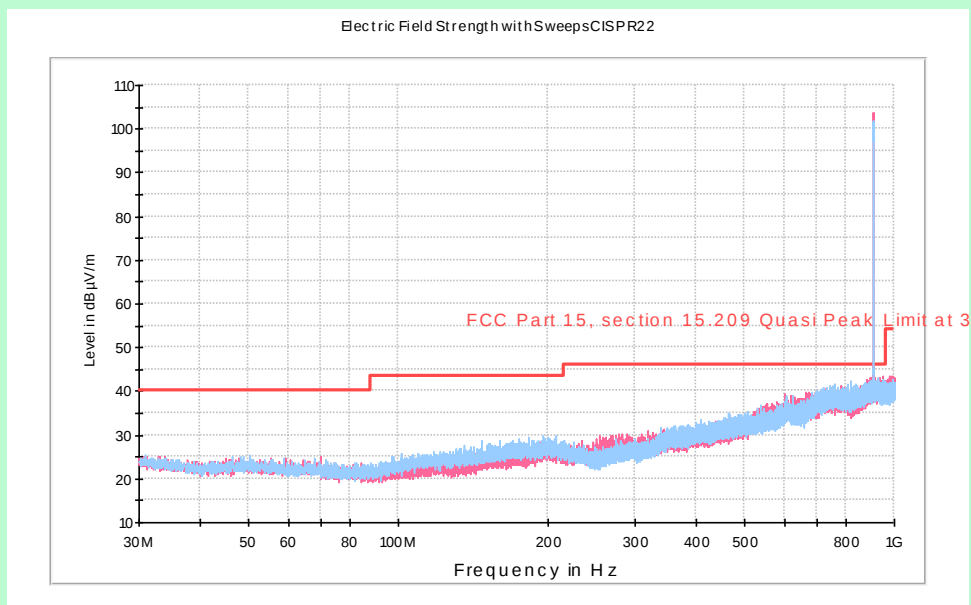
Note : Peak Graph - Parallel

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 FOUND									PASS
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

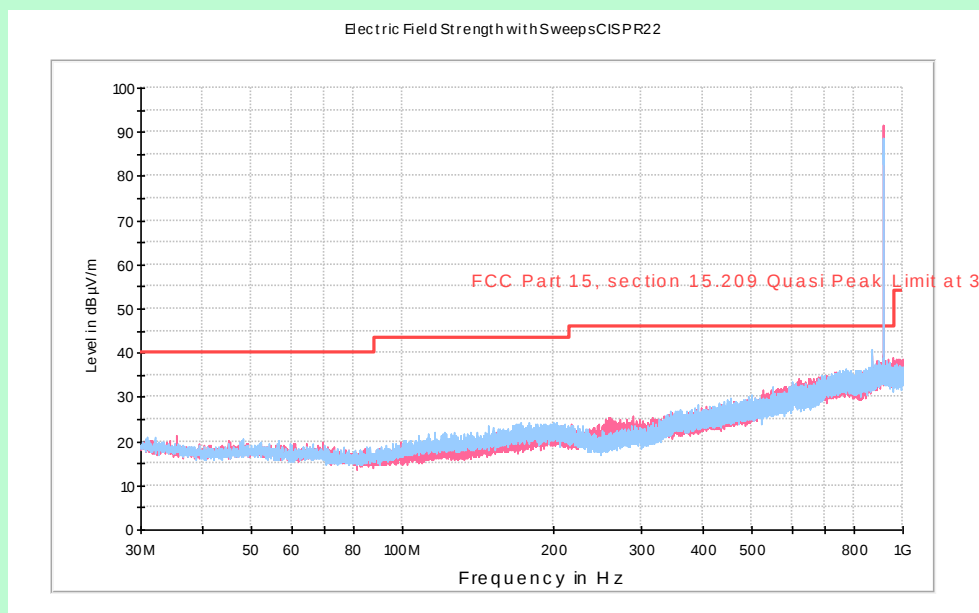
TEST GRAPHS – 30 MHz to 1 GHz

**Channel 1 (902.875 MHz)**

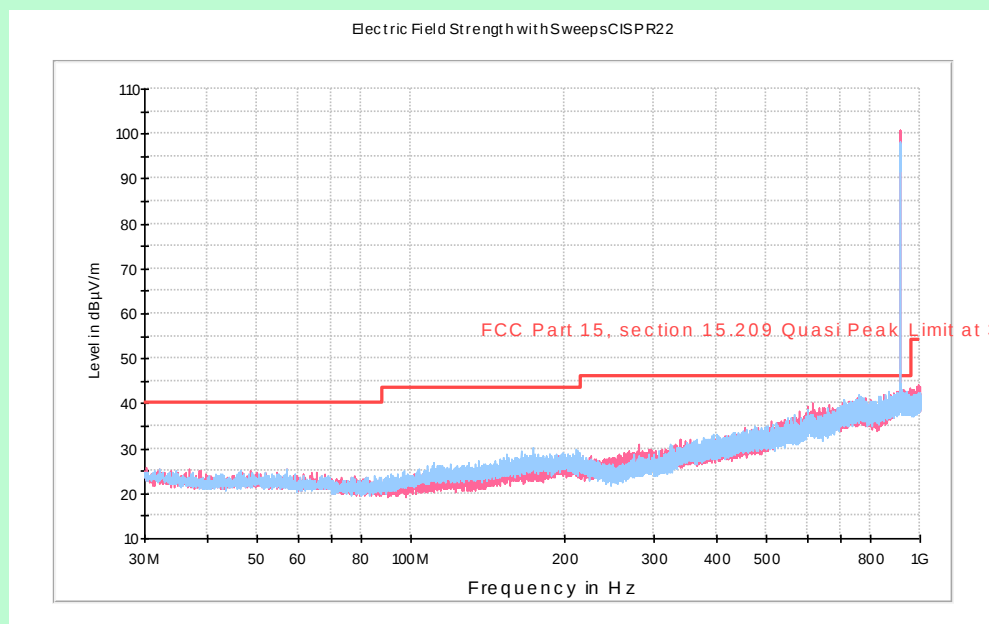
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 2 (908.425 MHz)**

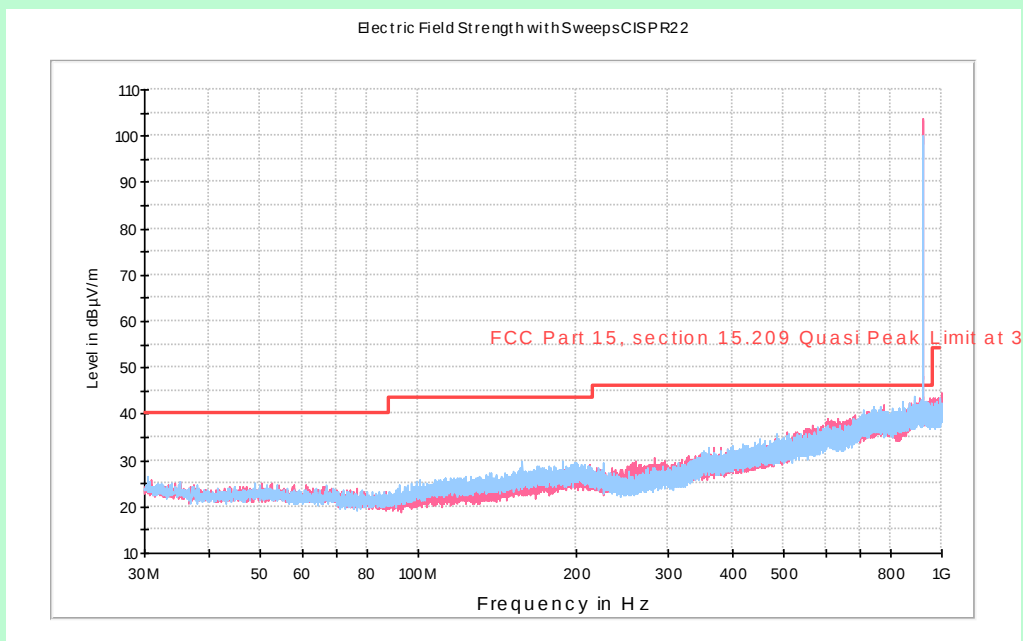
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 3 (914.325 MHz)**

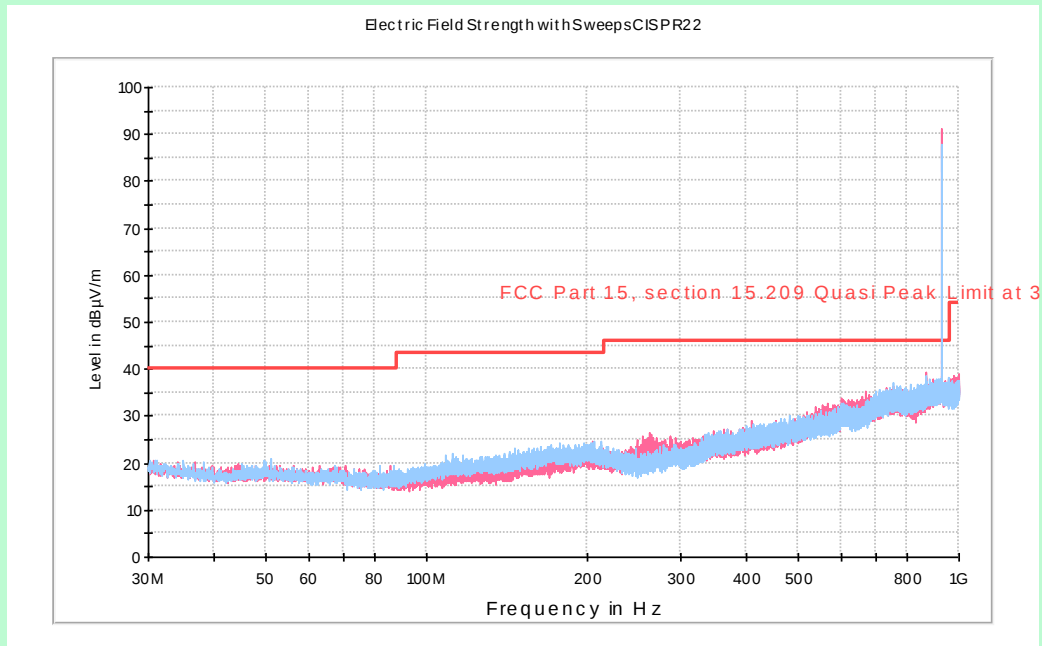
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 4 (915.325 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 5 (921.575 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

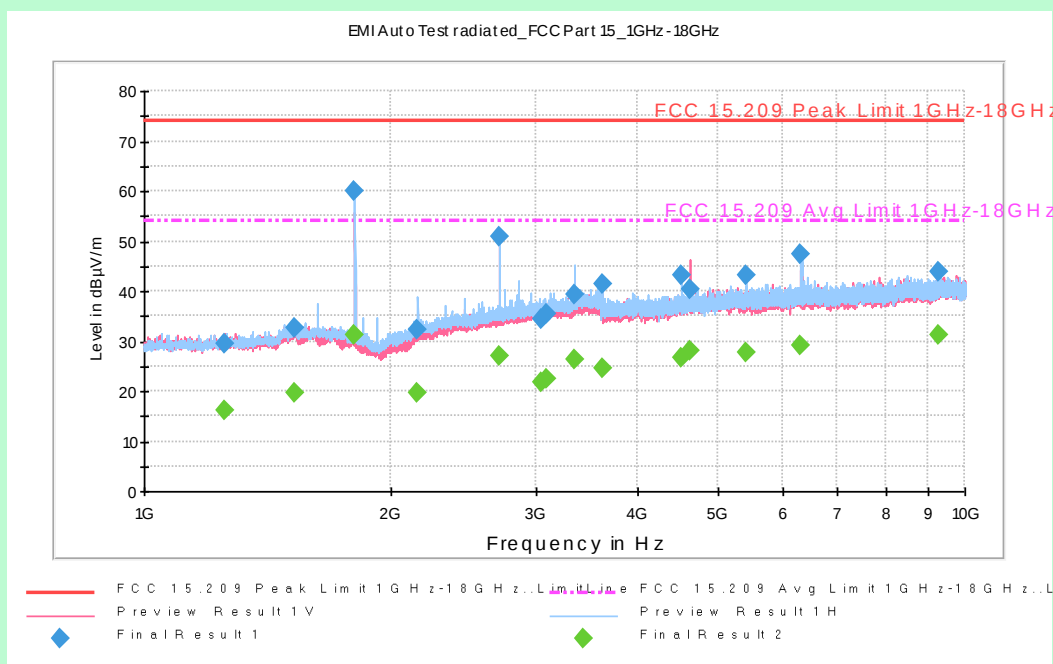
**Channel 6 (927.125 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

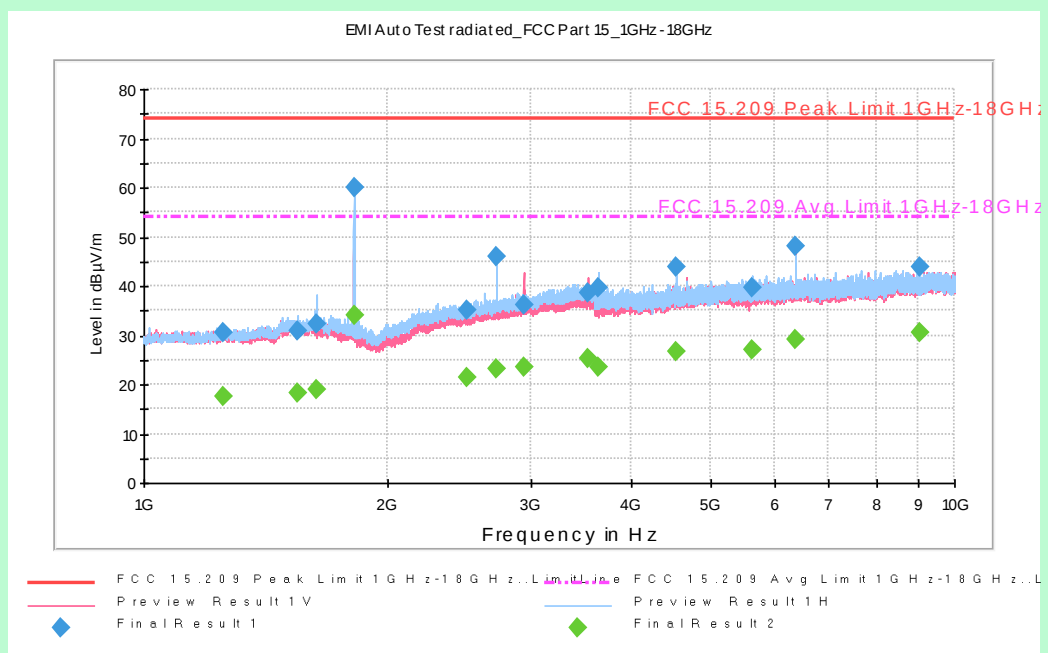
TEST RESULT – 30 MHz to 1 GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	cm	H / V	deg	dB	dBµV/m	
1	30.65	19.4	100.0	V	300.0	20.6	40.0	PASS
1	43.36	18.2	200.0	V	60.0	21.8	40.0	PASS
1	64.28	18.0	300.0	V	30.0	22.0	40.0	PASS
1	105.35	19.5	100.0	H	180.0	24.0	43.5	PASS
1	165.26	22.7	300.0	H	0.0	20.8	43.5	PASS
1	200.43	23.6	100.0	H	150.0	19.9	43.5	PASS
1	330.03	24.9	100.0	V	60.0	21.1	46.0	PASS
1	469.67	28.5	100.0	H	270.0	17.5	46.0	PASS
1	700.03	34.5	300.0	H	120.0	11.5	46.0	PASS
1	734.13	35.2	100.0	H	90.0	10.8	46.0	PASS
1	902.72	101.8	100.0	V	240.0	-43.8	46.0	INTENDED FREQ
2	30.77	19.7	100.0	H	90.0	20.3	40.0	PASS
2	49.22	18.4	200.0	V	240.0	21.6	40.0	PASS
2	68.88	18.0	100.0	H	60.0	22.0	40.0	PASS
2	86.88	17.6	100.0	H	60.0	22.4	40.0	PASS
2	169.97	23.1	300.0	H	240.0	20.4	43.5	PASS
2	196.94	23.4	100.0	H	60.0	20.1	43.5	PASS
2	349.57	26.1	400.0	H	210.0	19.9	46.0	PASS
2	464.55	28.4	100.0	H	30.0	17.6	46.0	PASS
2	700.53	34.5	100.0	H	180.0	11.5	46.0	PASS
2	761.04	35.6	100.0	H	150.0	10.4	46.0	PASS
2	816.66	35.3	100.0	H	300.0	10.7	46.0	PASS
2	908.27	102.2	100.0	V	240.0	-44.2	46.0	INTENDED FREQ
3	35.77	18.6	100.0	H	30.0	21.4	40.0	PASS
3	48.49	18.5	100.0	H	0.0	21.5	40.0	PASS
3	68.47	18.2	300.0	V	0.0	21.8	40.0	PASS
3	86.74	17.0	300.0	V	120.0	23.0	40.0	PASS
3	173.03	23.2	100.0	H	330.0	20.3	43.5	PASS
3	180.08	23.2	100.0	H	30.0	20.3	43.5	PASS
3	343.61	25.6	100.0	H	30.0	20.4	46.0	PASS
3	489.78	28.8	400.0	H	90.0	17.2	46.0	PASS
3	699.80	33.8	200.0	V	300.0	12.2	46.0	PASS
3	866.11	38.6	100.0	V	120.0	7.4	46.0	PASS
3	867.23	35.8	100.0	V	90.0	10.2	46.0	PASS
3	914.18	90.2	100	V	240	-44.2	46	INTENDED FREQ
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1 GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

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	
4	31.30	19.4	100.0	V	300.0	20.6	40.0	PASS
4	57.49	18.0	200.0	V	150.0	22.0	40.0	PASS
4	64.25	17.7	100.0	H	240.0	22.3	40.0	PASS
4	86.84	17.0	100.0	V	0.0	23.0	40.0	PASS
4	164.44	22.7	100.0	H	270.0	20.8	43.5	PASS
4	172.83	23.1	400.0	H	300.0	20.4	43.5	PASS
4	280.54	23.8	100.0	V	330.0	22.2	46.0	PASS
4	338.20	25.2	100.0	V	330.0	20.8	46.0	PASS
4	472.01	28.5	300.0	H	240.0	17.5	46.0	PASS
4	612.51	33.0	100.0	V	0.0	13.0	46.0	PASS
4	915.17	99.7	100.0	V	120.0	-41.7	46.0	INTENDED FREQ
4	31.30	19.4	100.0	V	300.0	20.6	40.0	PASS
5	31.14	19.6	100.0	H	210.0	20.4	40.0	PASS
5	49.33	18.6	200.0	H	0.0	21.4	40.0	PASS
5	60.37	17.7	100.0	H	150.0	22.3	40.0	PASS
5	87.97	16.9	300.0	V	0.0	23.1	40.0	PASS
5	159.33	22.3	200.0	H	0.0	21.2	43.5	PASS
5	188.66	23.0	100.0	H	270.0	20.5	43.5	PASS
5	349.30	26.1	400.0	H	300.0	19.9	46.0	PASS
5	484.46	28.8	100.0	H	0.0	17.2	46.0	PASS
5	703.31	34.5	100.0	H	120.0	11.5	46.0	PASS
5	840.64	35.6	300.0	H	270.0	10.4	46.0	PASS
5	921.43	102.1	100.0	V	300.0	-44.1	46.0	INTENDED FREQ
5	998.57	37.9	100.0	V	180.0	16.1	54.0	PASS
6	31.90	19.4	100.0	H	0.0	20.6	40.0	PASS
6	52.08	18.4	400.0	V	210.0	21.6	40.0	PASS
6	67.62	17.9	100.0	H	120.0	22.1	40.0	PASS
6	86.31	17.5	100.0	H	270.0	22.5	40.0	PASS
6	170.60	23.1	300.0	H	300.0	20.4	43.5	PASS
6	205.64	23.2	100.0	H	90.0	20.3	43.5	PASS
6	253.99	22.7	100.0	V	30.0	23.3	46.0	PASS
6	261.99	23.7	100.0	V	0.0	22.3	46.0	PASS
6	264.21	23.7	200.0	V	60.0	22.3	46.0	PASS
6	347.09	25.9	100.0	H	180.0	20.1	46.0	PASS
6	926.97	90.2	100	V	240	-44.2	46	INTENDED FREQ
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

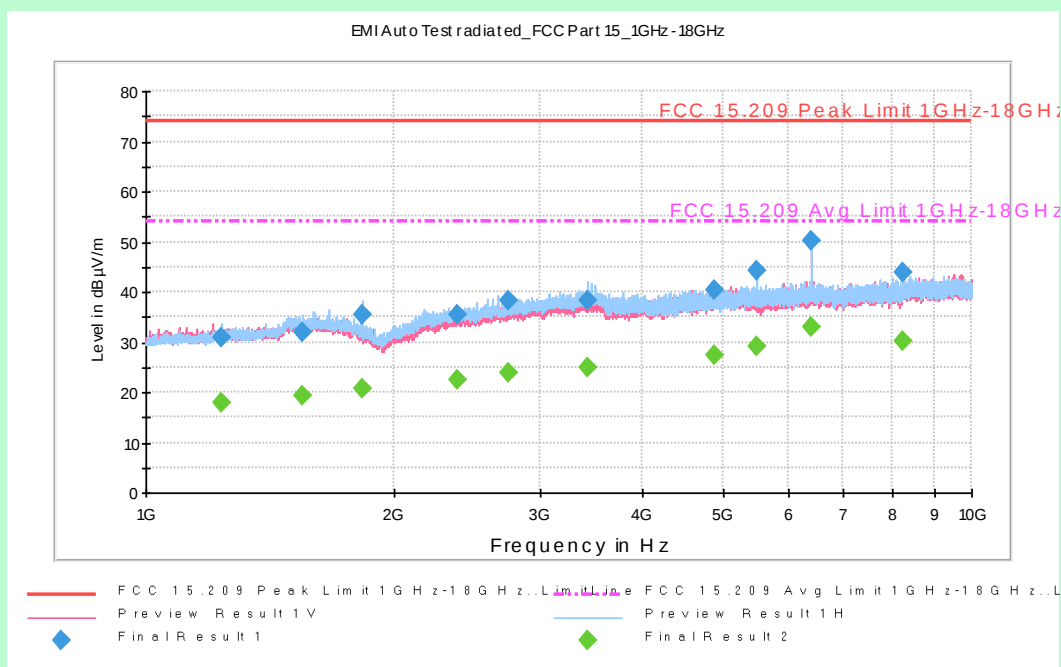
TEST GRAPHS – 1 GHz to 10 GHz



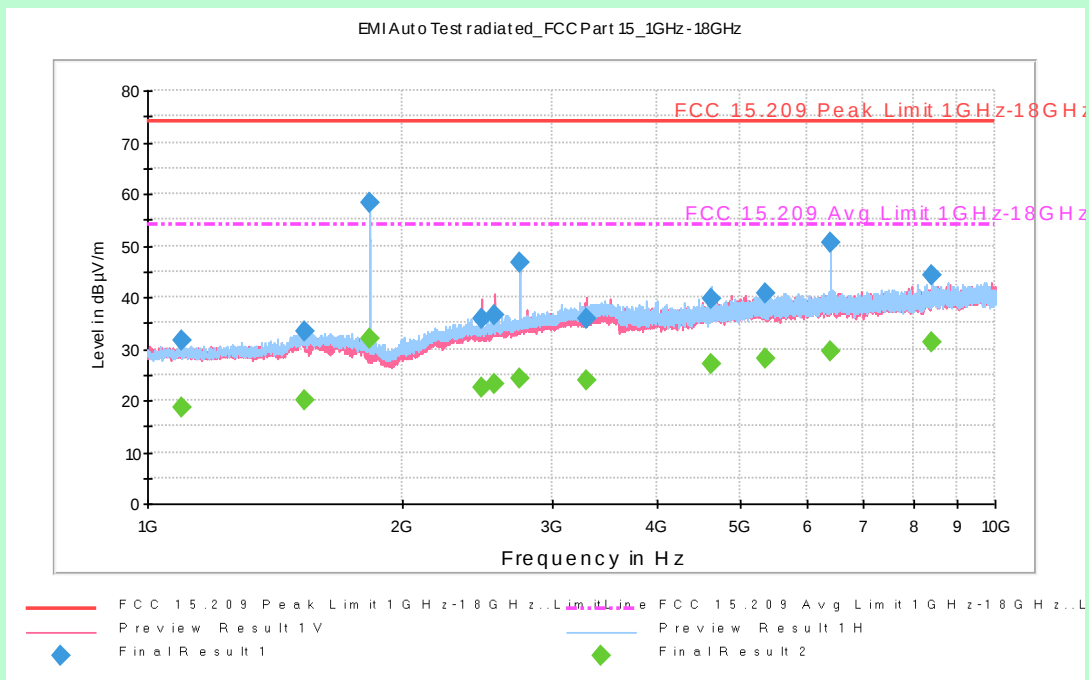
Channel 1 (902.875 MHz)



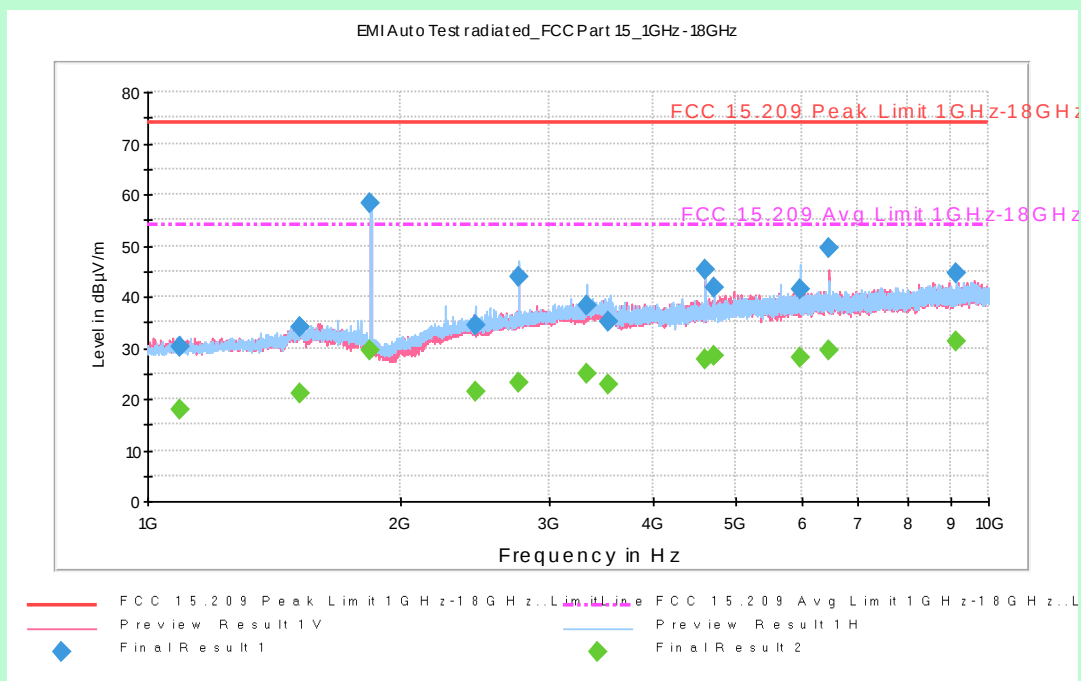
Channel 2 (908.425 MHz)



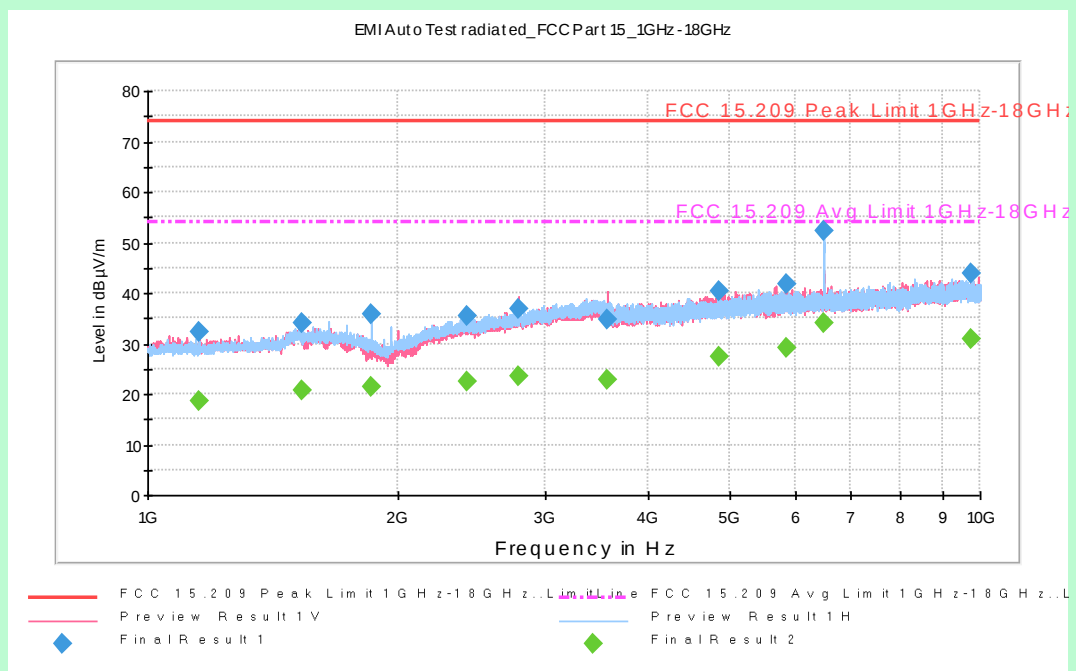
Channel 3 (914.325 MHz)



Channel 4 (915.325 MHz)



Channel 5 (921.575 MHz)



Channel 6 (927.125 MHz)

TEST RESULT – 1 GHz to 10 GHz					RESTRICTED BAND – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
1	1256.1	29.5	100.0	V	176.0	44.5	74.0
1	1524.7	32.7	100.0	V	132.0	41.3	74.0
1	2156.1	32.3	400.0	V	154.0	41.7	74.0
1	2707.8	51.1	100.0	H	44.0	26.2	74.0
1	3043.9	34.5	300.0	H	44.0	39.5	74.0
1	3094.3	35.3	300.0	H	44.0	38.7	74.0
1	3346.8	39.2	400.0	H	242.0	34.8	74.0
1	3612.7	41.3	200.0	V	88.0	32.7	74.0
1	4513.2	43.1	200.0	H	88.0	30.9	74.0
1	4636.0	40.4	400.0	V	154.0	33.6	74.0
1	5418.6	43.2	200.0	H	286.0	30.8	74.0
1	6318.6	47.4	100.0	H	44.0	26.6	74.0
1	9280.0	44.0	400.0	V	22.0	30.0	74.0
2	1254.3	30.6	400.0	V	110.0	43.4	74.0
2	1545.4	31.0	400.0	V	110.0	43.0	74.0
2	1636.8	32.3	300.0	H	308.0	41.7	74.0
2	2502.6	35.0	400.0	V	22.0	39.0	74.0
2	2726.2	46.1	100.0	H	44.0	27.9	74.0
2	2938.2	36.0	400.0	V	242.0	38.0	74.0
2	3529.9	38.7	400.0	V	22.0	35.3	74.0
2	3634.3	39.6	200.0	V	132.0	34.4	74.0
2	4543.3	43.7	200.0	H	308.0	30.3	74.0
2	5633.2	39.7	400.0	V	330.0	34.3	74.0
2	6360.9	48.2	100.0	H	44.0	25.8	74.0
2	9042.9	43.7	400.0	H	330.0	30.3	74.0
3	1234.9	30.7	400.0	V	110.0	43.3	74.0
3	1551.3	31.8	400.0	V	66.0	42.2	74.0
3	2386.5	35.5	400.0	V	242.0	38.5	74.0
3	2743.8	38.2	300.0	H	0.0	35.8	74.0
3	3427.3	38.3	400.0	V	66.0	35.7	74.0
3	4872.7	40.2	400.0	V	330.0	33.8	74.0
3	5487.9	44.3	200.0	H	308.0	29.7	74.0
3	6402.3	50.3	100.0	H	44.0	23.7	74.0
3	8273.8	43.8	400.0	V	22.0	30.2	74.0

Note :
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 – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
4	1096.3	31.5	400.0	V	198.0	42.5	74.0
4	1530.1	33.3	400.0	V	198.0	40.7	74.0
4	2482.3	35.9	400.0	V	198.0	38.1	74.0
4	2572.8	36.5	400.0	V	198.0	37.5	74.0
4	2746.9	46.5	300.0	H	0.0	27.5	74.0
4	3303.1	35.9	400.0	V	154.0	38.1	74.0
4	4633.8	39.8	400.0	V	66.0	34.2	74.0
4	5367.7	40.8	400.0	H	110.0	33.2	74.0
4	6409.5	50.6	100.0	H	44.0	23.4	74.0
4	8441.7	44.1	400.0	V	242.0	29.9	74.0
5	1090.9	30.3	400.0	V	66.0	43.7	74.0
5	1520.7	34.2	400.0	V	286.0	39.8	74.0
5	2449.9	34.3	400.0	V	66.0	39.7	74.0
5	2763.6	43.9	300.0	H	22.0	30.1	74.0
5	3336.4	38.2	400.0	V	286.0	35.8	74.0
5	3534.4	35.1	400.0	V	22.0	38.9	74.0
5	4609.0	45.2	200.0	H	308.0	28.8	74.0
5	4726.0	41.7	400.0	V	110.0	32.3	74.0
5	5967.1	41.3	300.0	H	352.0	32.7	74.0
5	6449.1	49.4	200.0	H	22.0	24.6	74.0
5	9175.6	44.6	400.0	H	242.0	29.4	74.0
6	1155.7	32.3	400.0	V	286.0	41.7	74.0
6	1529.7	33.9	400.0	V	286.0	40.1	74.0
6	2416.6	35.6	400.0	V	330.0	38.4	74.0
6	2788.8	36.7	400.0	V	22.0	37.3	74.0
6	3567.7	34.9	400.0	V	110.0	39.1	74.0
6	4863.3	40.2	400.0	V	66.0	33.8	74.0
6	5847.9	41.7	400.0	V	66.0	32.3	74.0
6	6487.8	52.4	100.0	H	44.0	21.6	74.0
6	9773.7	43.9	100.0	H	110.0	30.1	74.0
Note : 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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
1	1256.1	16.2	100.0	V	176.0	37.8	54.0
1	1524.7	19.7	100.0	V	132.0	34.3	54.0
1	2156.1	19.8	400.0	V	154.0	34.2	54.0
1	2707.8	27.0	100.0	H	44.0	30.0	54.0
1	3043.9	21.7	300.0	H	44.0	32.3	54.0
1	3094.3	22.4	300.0	H	44.0	31.6	54.0
1	3346.8	26.2	400.0	H	242.0	27.8	54.0
1	3612.7	24.7	200.0	V	88.0	29.3	54.0
1	4513.2	26.7	200.0	H	88.0	27.3	54.0
1	4636.0	27.9	400.0	V	154.0	26.1	54.0
1	5418.6	27.8	200.0	H	286.0	26.2	54.0
1	6318.6	29.2	100.0	H	44.0	24.8	54.0
1	9280.0	31.3	400.0	V	22.0	22.7	54.0
2	1254.3	17.6	400.0	V	110.0	36.4	54.0
2	1545.4	18.3	400.0	V	110.0	35.7	54.0
2	1636.8	18.9	300.0	H	308.0	35.1	54.0
2	2502.6	21.5	400.0	V	22.0	32.5	54.0
2	2726.2	23.0	100.0	H	44.0	31.0	54.0
2	2938.2	23.4	400.0	V	242.0	30.6	54.0
2	3529.9	25.3	400.0	V	22.0	28.7	54.0
2	3634.3	23.5	200.0	V	132.0	30.5	54.0
2	4543.3	26.7	200.0	H	308.0	27.3	54.0
2	5633.2	27.0	400.0	V	330.0	27.0	54.0
2	6360.9	29.2	100.0	H	44.0	24.8	54.0
2	9042.9	30.5	400.0	H	330.0	23.5	54.0
3	1234.9	18.0	400.0	V	110.0	36.0	54.0
3	1551.3	19.4	400.0	V	66.0	34.6	54.0
3	2386.5	22.4	400.0	V	242.0	31.6	54.0
3	2743.8	23.9	300.0	H	0.0	30.1	54.0
3	3427.3	25.0	400.0	V	66.0	29.0	54.0
3	4872.7	27.3	400.0	V	330.0	26.7	54.0
3	5487.9	29.0	200.0	H	308.0	25.0	54.0
3	6402.3	33.0	100.0	H	44.0	21.0	54.0
3	8273.8	30.1	400.0	V	22.0	23.9	54.0

Note :
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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
4	1096.3	18.5	400.0	V	198.0	35.5	54.0
4	1530.1	20.2	400.0	V	198.0	33.8	54.0
4	2482.3	22.5	400.0	V	198.0	31.5	54.0
4	2572.8	23.1	400.0	V	198.0	30.9	54.0
4	2746.9	24.4	300.0	H	0.0	29.6	54.0
4	3303.1	23.8	400.0	V	154.0	30.2	54.0
4	4633.8	26.9	400.0	V	66.0	27.1	54.0
4	5367.7	28.1	400.0	H	110.0	25.9	54.0
4	6409.5	29.6	100.0	H	44.0	24.4	54.0
4	8441.7	31.3	400.0	V	242.0	22.8	54.0
5	1090.9	17.8	400.0	V	66.0	36.2	54.0
5	1520.7	20.9	400.0	V	286.0	33.1	54.0
5	2449.9	21.6	400.0	V	66.0	32.4	54.0
5	2763.6	23.0	300.0	H	22.0	31.0	54.0
5	3336.4	25.0	400.0	V	286.0	29.0	54.0
5	3534.4	22.9	400.0	V	22.0	31.1	54.0
5	4609.0	27.7	200.0	H	308.0	26.3	54.0
5	4726.0	28.6	400.0	V	110.0	25.4	54.0
5	5967.1	28.0	300.0	H	352.0	26.0	54.0
5	6449.1	29.5	200.0	H	22.0	24.5	54.0
5	9175.6	31.4	400.0	H	242.0	22.6	54.0
6	1155.7	18.7	400.0	V	286.0	35.3	54.0
6	1529.7	20.8	400.0	V	286.0	33.2	54.0
6	2416.6	22.6	400.0	V	330.0	31.4	54.0
6	2788.8	23.5	400.0	V	22.0	30.5	54.0
6	3567.7	22.8	400.0	V	110.0	31.2	54.0
6	4863.3	27.5	400.0	V	66.0	26.5	54.0
6	5847.9	29.0	400.0	V	66.0	25.0	54.0
6	6487.8	34.0	100.0	H	44.0	20.0	54.0
6	9773.7	30.8	100.0	H	110.0	23.2	54.0
Note : 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	Spurious Emission	Measured Harmonic	Height	Ant Pol	Azimuth	Limit [Fundamental – 20 dBc]	Margin	Results
#	dBμV/m	GHz	dBμV/m	cm	H / V	deg	dBμV/m	dB	
1	101.8	1805.1	60.1	200	V	88.0	81.80	21.70	PASS
2	102.2	1816.3	60.1	400	V	66.0	82.20	22.10	PASS
3	90.2	1828	35.6	300	V	88.0	70.20	34.60	PASS
4	99.7	1831.2	58.1	300	V	44.0	79.70	21.60	PASS
5	102.1	1842.4	58.3	300	V	66.0	82.10	23.80	PASS
6	102.2	1853.7	35.9	300	V	88.0	82.20	46.30	PASS
Note : Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)									

Wireless Heat Detector

4 FHSS CHANNELS

4.1 SPURIOUS RADIATED EMISSIONS

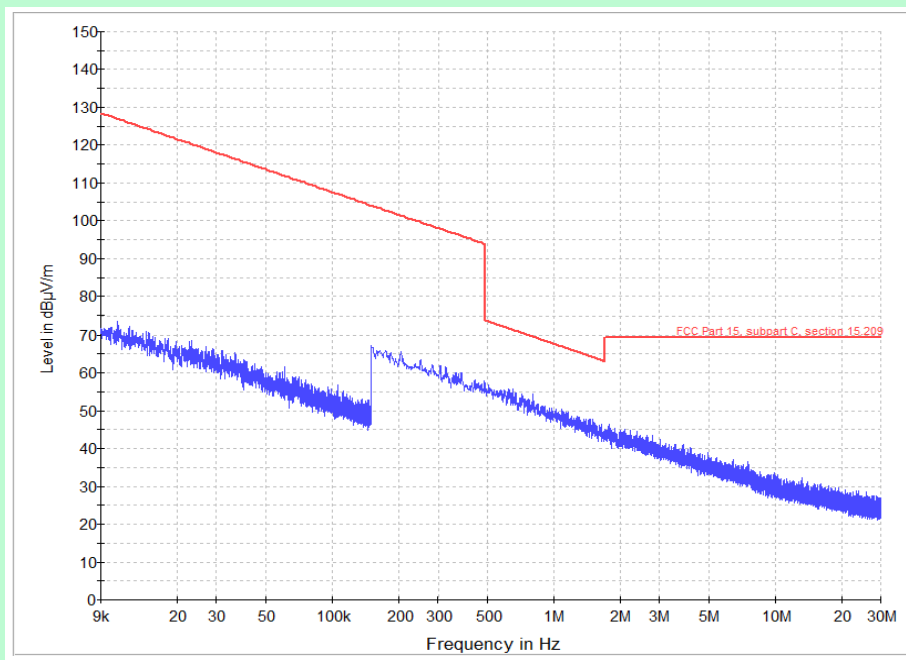
EUT Nomenclature	Wireless Smoke Detector	Test Report No.	EMC-0004-1
Model No.	FWH-200FIX135	Serial No.	01
Test Start Date	22-Oct-2013	Temperature (°C)	22.5
Test End Date	14-Dec-2013	Humidity RH (%)	56.1
Tested By	Gulshan Kumar	Pressure (mbar)	NR
Input Voltage / Freq	3.3Vdc		
Operating Mode	Refer Page 5 Operating Modes Table		
Test configuration	Refer Page 5 Test Configuration Table		
Deviation from Std	NA		
Comment			
TEST FREQUENCY RANGE			
Start Frequency	9 KHz	Stop Frequency	10 GHz
MAXIMUM OPERATING FREQUENCY			
902MHz to 928MHz			
TEST PARAMETERS			
Antenna Height	1m to 4m	Turntable Rotation	0° to 360°
Applicable standard	FCC Part 15.247 and 15.209	Test Method	DA 00-705
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	04-Feb-2014
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	31-Dec-2013
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	00064055	07-Nov-2013
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	30-Nov-2013
Y	Loop Antenna	ETS Lindgren	6507	000103694	12-Mar-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1A	09-May-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1B	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2A	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2B	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	09-May-2014
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

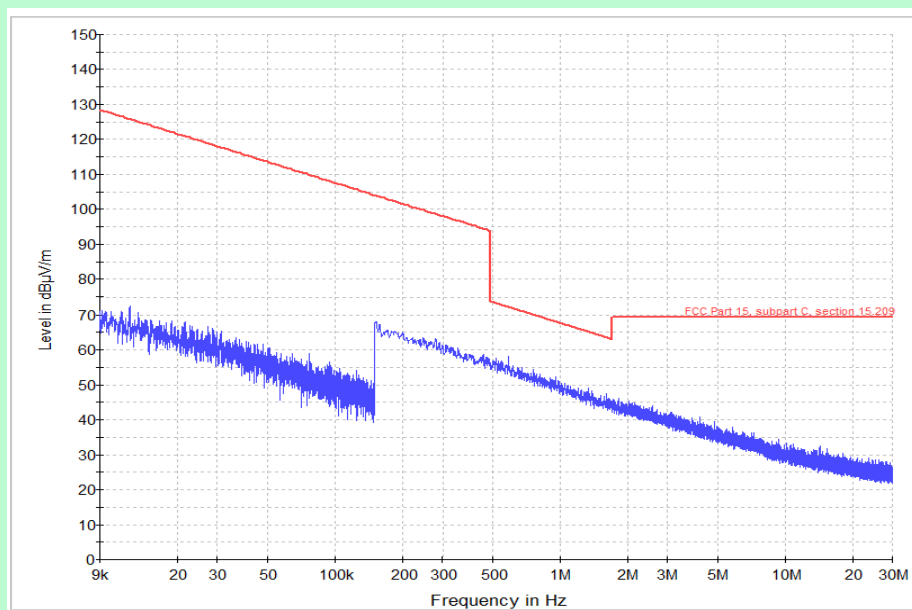
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – 9 KHz to 30 MHz



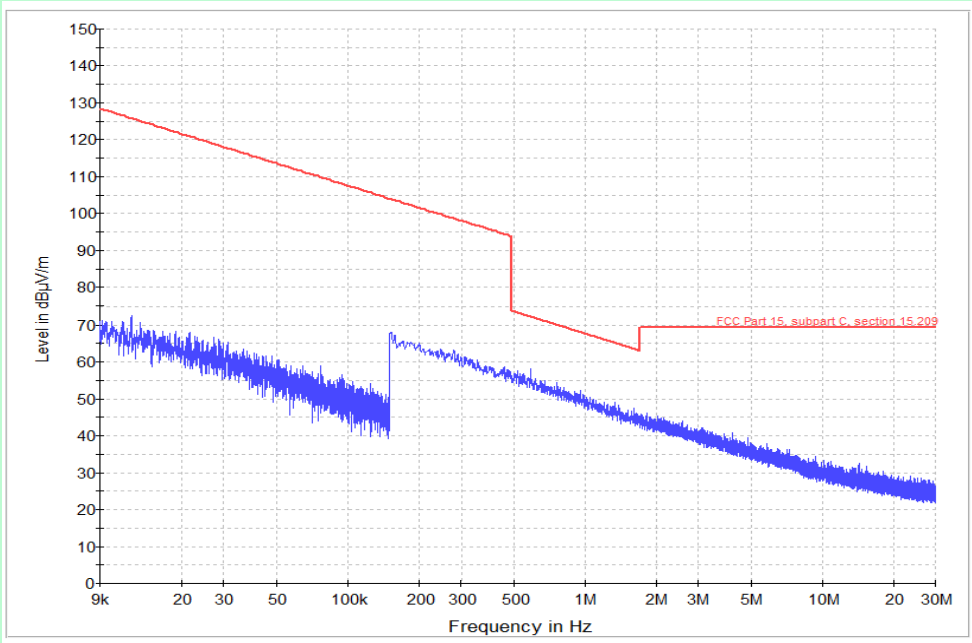
Channel 1 (903.55 MHz)

Note : Peak Graph - Parallel



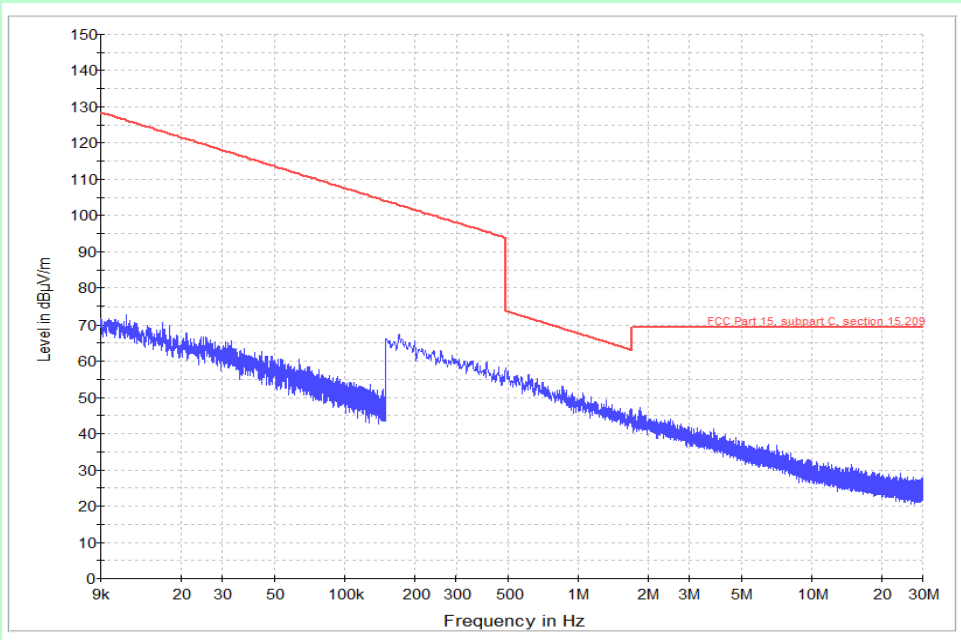
Channel 1 (903.55 MHz)

Note : Peak Graph - Perpendicular



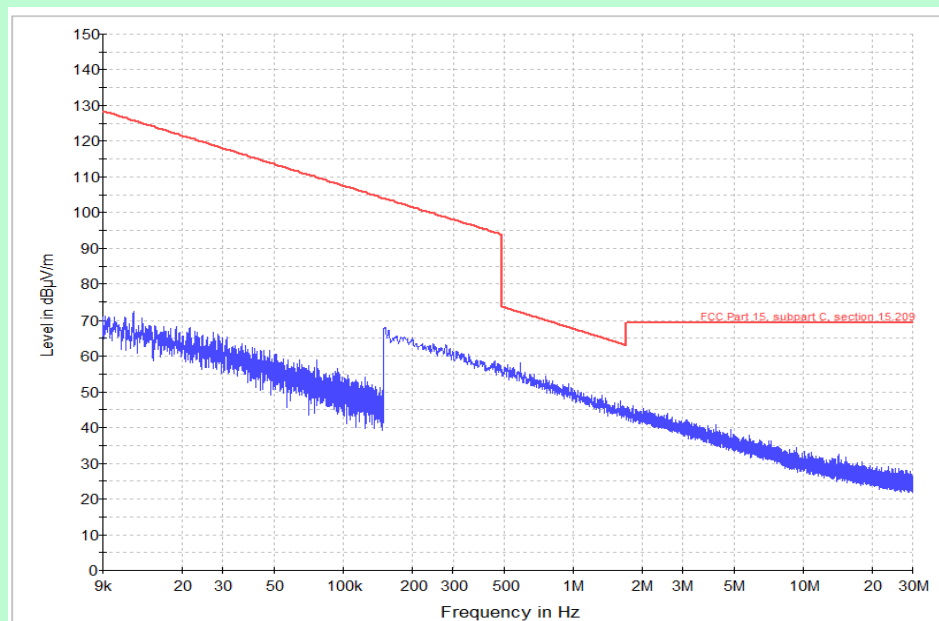
Channel 27 (916.35 MHz)

Note : Peak Graph - Parallel

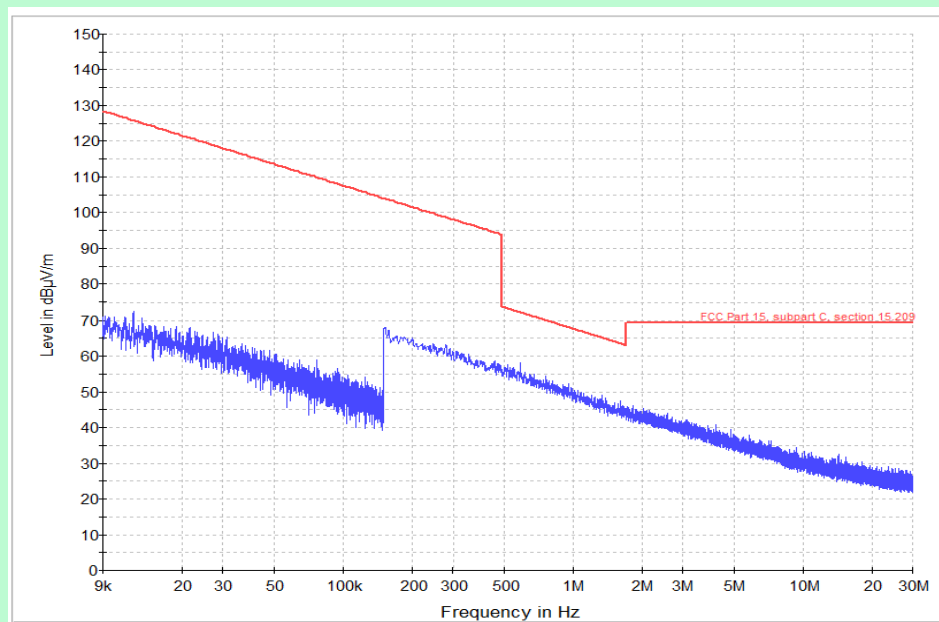


Channel 27 (916.35 MHz)

Note : Peak Graph - Perpendicular

**Channel 52 (926.45 MHz)**

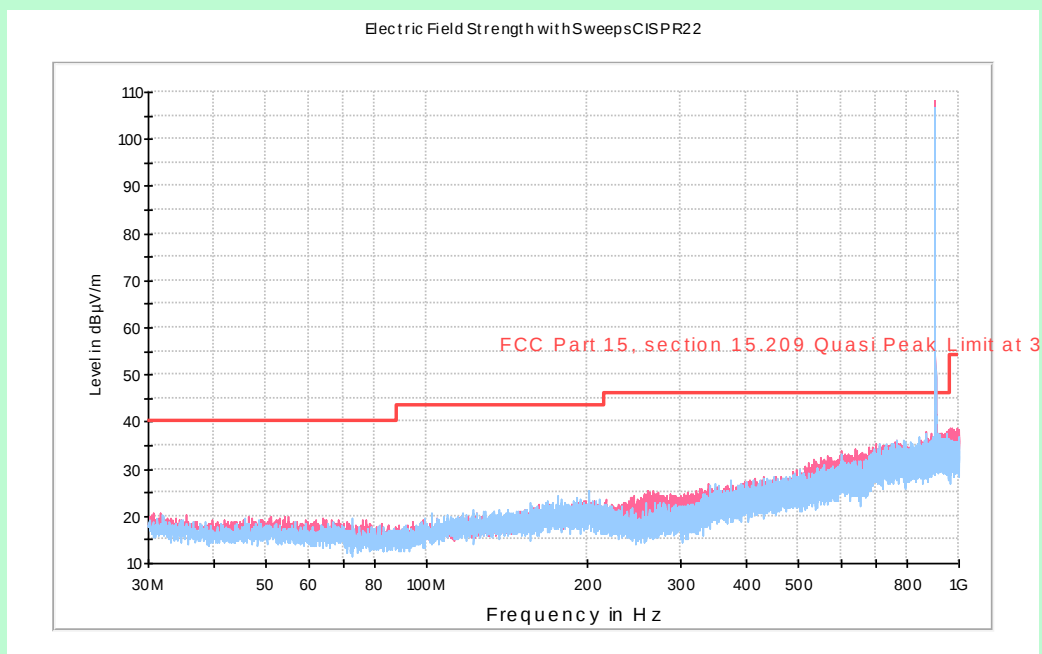
Note : Peak Graph - Parallel

**Channel 52 (926.45 MHz)**

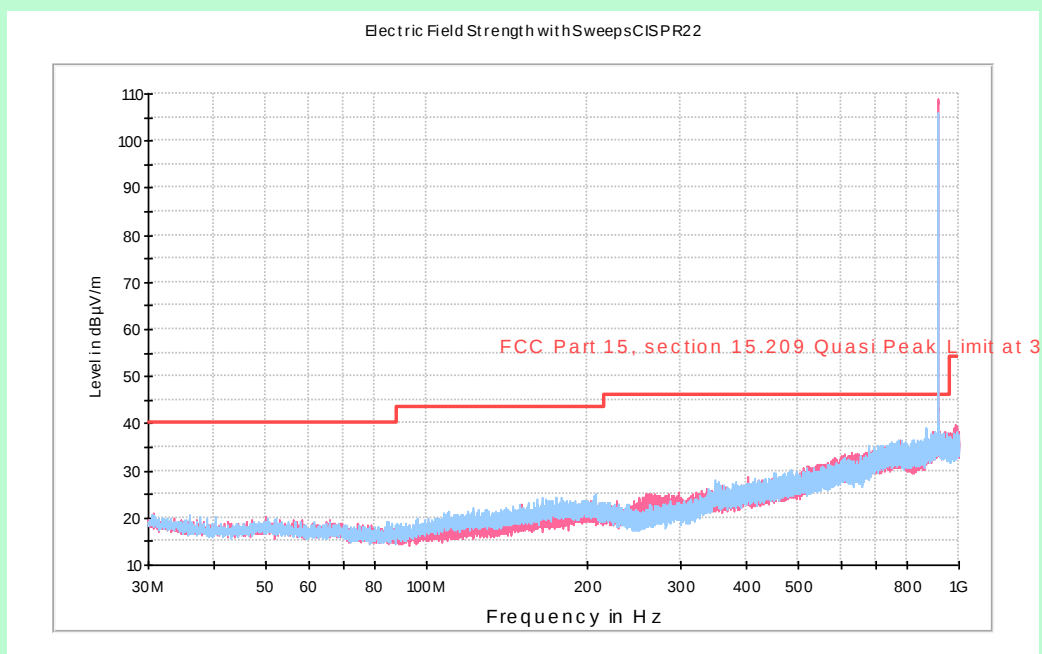
Note : Peak Graph - Perpendicular

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 FOUND									PASS
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

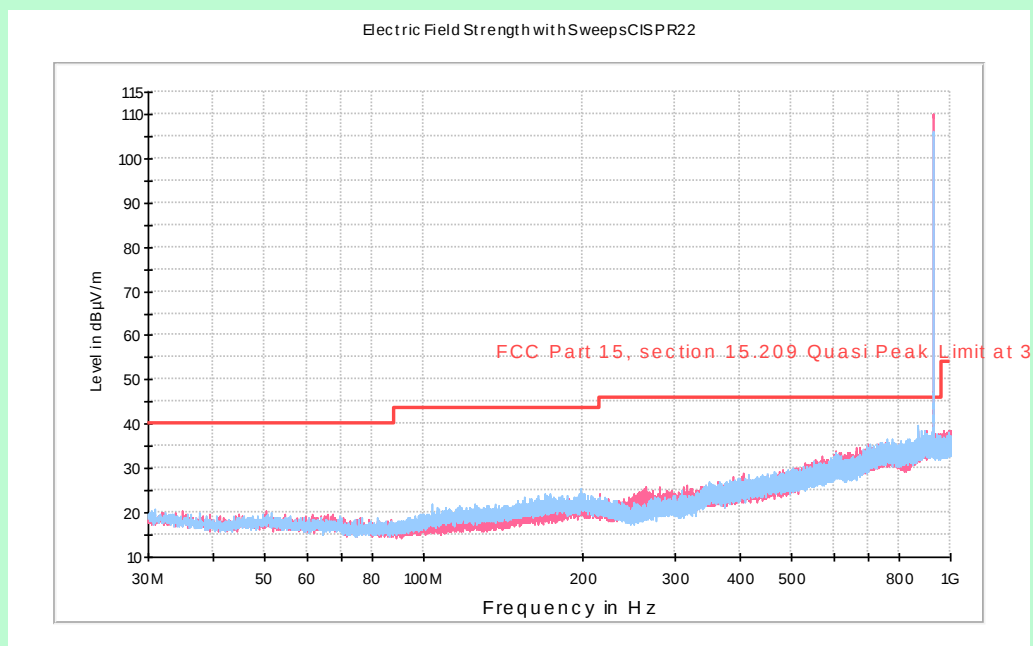
TEST GRAPHS – 30 MHz to 1 GHz

**Channel 1 (903.55 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 27 (916.35 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)



Channel 52 (926.45 MHz)

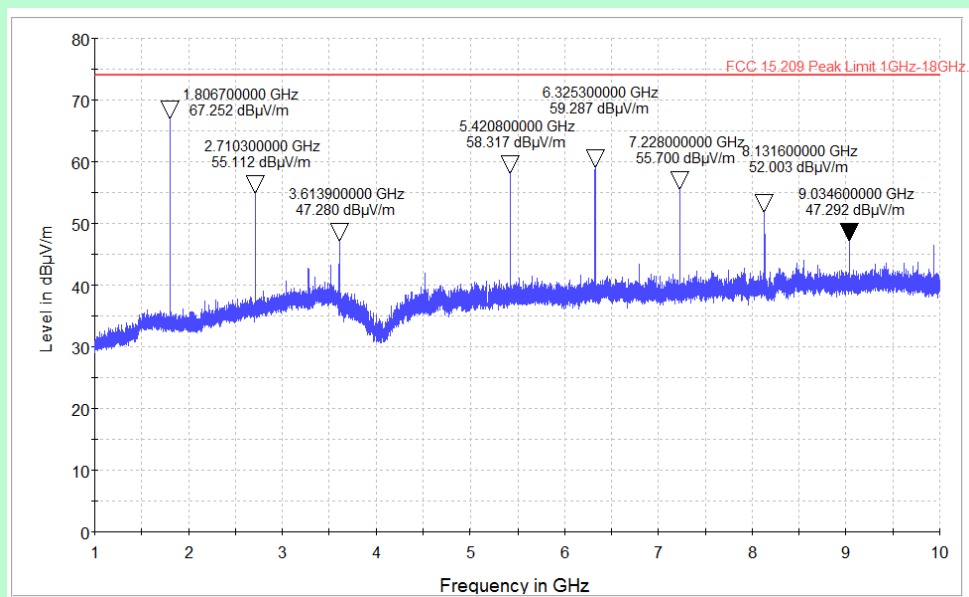
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

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	
1	31.67	19.6	100	H	60	20.4	40	PASS
1	54.06	18.2	100	V	120	21.8	40	PASS
1	63.11	18	200	V	60	22	40	PASS
1	201.86	23.5	100	H	270	20	43.5	PASS
1	349.2	26.1	400	H	0	19.9	46	PASS
1	489.61	28.8	100	H	240	17.2	46	PASS
1	567.83	31.4	100	V	0	14.6	46	PASS
1	600.37	33.1	200	V	270	12.9	46	PASS
1	699.12	34.4	100	H	90	11.6	46	PASS
1	761.94	35.5	300	H	0	10.5	46	PASS
1	866.06	36.2	200	H	60	9.8	46	PASS
1	866.46	36.2	100	H	120	9.8	46	PASS
1	903.6	103.9	100	V	90	-45.9	46	INTENDED FREQUENCY
1	993.21	37.9	100	V	330	16.1	54	PASS
27	30.71	19.5	200	V	0	20.5	40	PASS
27	31.68	19.5	100	H	30	20.5	40	PASS

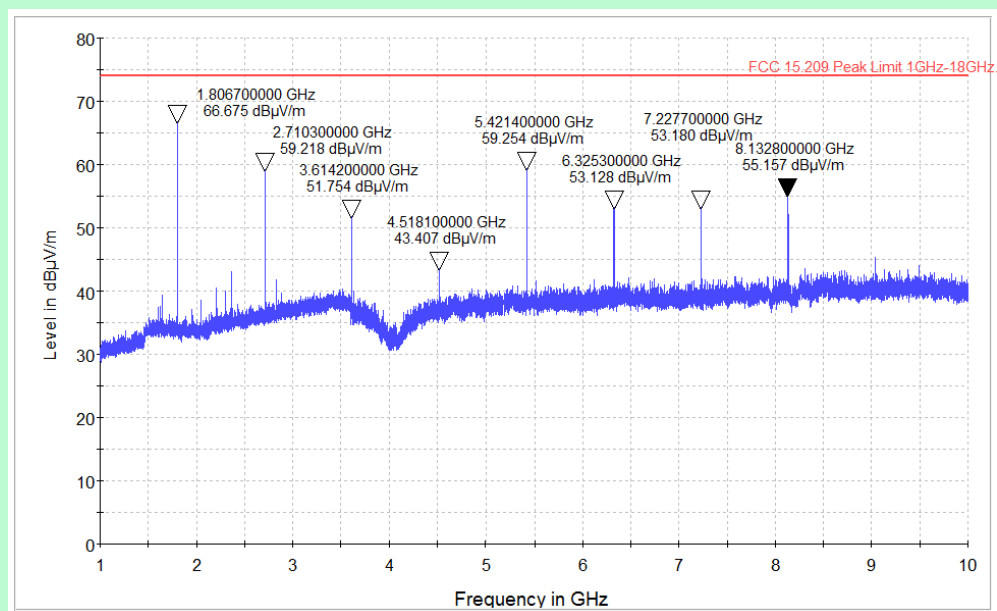
27	206.35	23.2	100	H	240	20.3	43.5	PASS
27	209.05	22.2	300	V	150	21.3	43.5	PASS
27	479.79	28.7	100	H	0	17.3	46	PASS
27	484.11	28.7	400	H	240	17.3	46	PASS
27	866.31	36.2	100	H	0	9.8	46	PASS
27	916.4	104.4	100	V	60	-46.4	46	INTENDED FREQUENCY
27	986.84	37.8	100	V	90	16.2	54	PASS
52	30.67	19.7	100	H	30	20.3	40	PASS
52	30.75	19.4	100	V	240	20.6	40	PASS
52	103.71	19.4	100	H	240	24.1	43.5	PASS
52	198.39	23.5	100	H	0	20	43.5	PASS
52	479.89	28.7	100	H	210	17.3	46	PASS
52	491.79	28.8	100	H	0	17.2	46	PASS
52	864.78	35.7	100	V	300	10.3	46	PASS
52	867.36	36.2	100	H	330	9.8	46	PASS
52	926.39	104.8	100	V	300	-46.8	46	INTENDED FREQUENCY
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

TEST GRAPHS – 1 GHz to 10 GHz



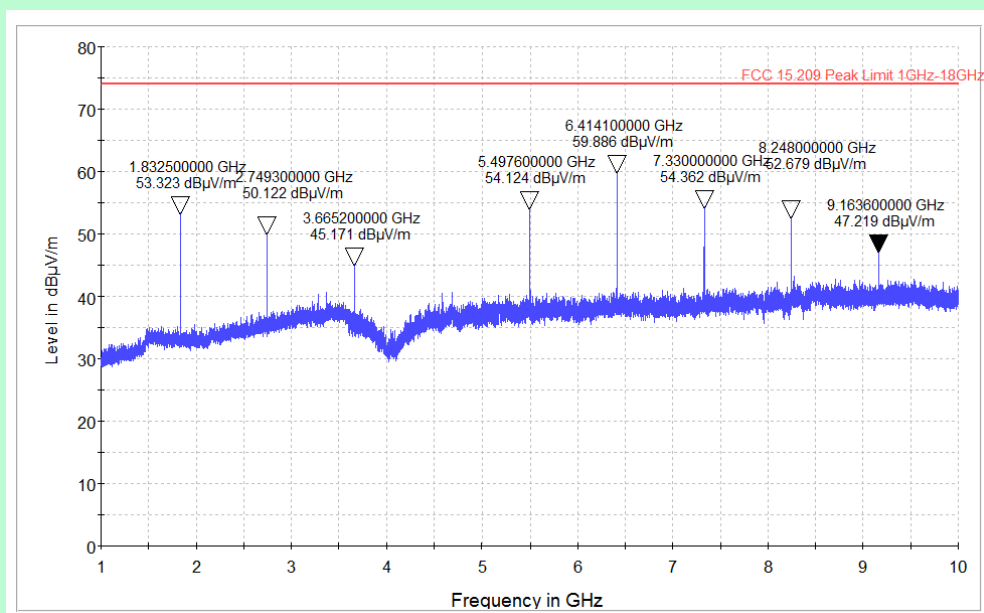
Channel 1 (903.55 MHz)

Note : Peak Graph - Horizontal



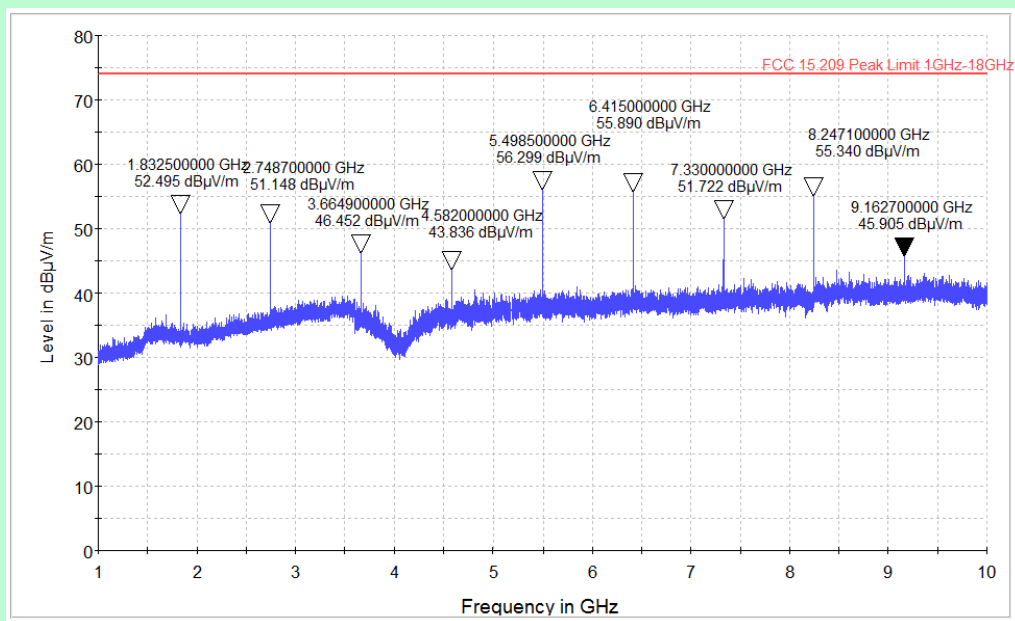
Channel 1 (903.55 MHz)

Note : Peak Graph - Vertical



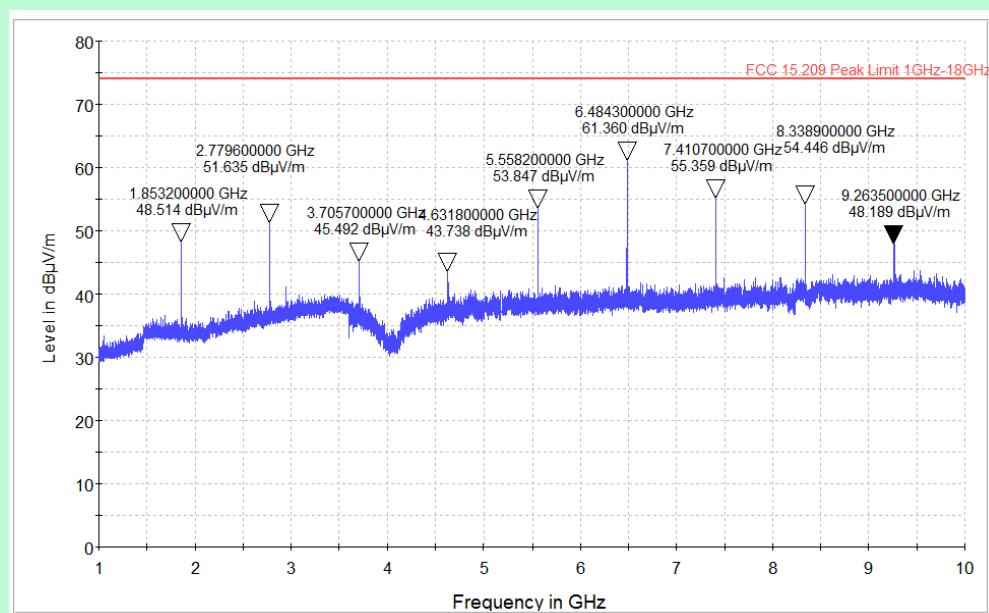
Channel 27 (916.35 M Hz)

Note : Peak Graph - Horizontal



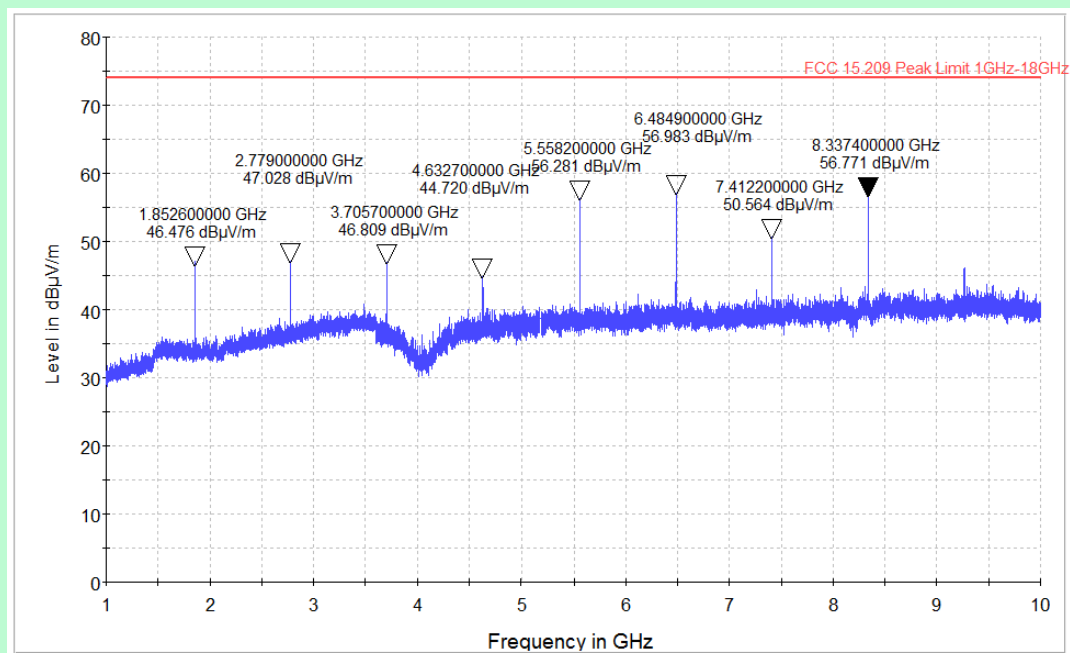
Channel 27 (916.35 M Hz)

Note : Peak Graph - Vertical



Channel 52 (926.45 MHz)

Note : Peak Graph - Horizontal



Channel 52 (926.45 MHz)

Note : Peak Graph - Vertical

TEST RESULT –1 GHz to 10 GHz							RESTRICTED BAND – PEAK & AVERAGE			
Channel	Spurious Frequency	Spurious Peak Level	Height	Ant Pol	Peak Limit	Peak Margin	Calculated Average Reading [Peak – Duty cycle]	Average Limit	Margin	Results
#	GHz	dBμV/m	cm	H / V	dBμV/m	dB	dBμV/m	dBμV/m	dB	
1	2.7	55.1	100	H	74	18.9	37.0	54	17.0	PASS
1	3.6	47.3	100	H	74	26.7	29.2	54	24.8	PASS
1	5.4	59.3	200	H	74	14.7	41.2	54	12.8	PASS
1	6.3	59.3	100	H	74	14.7	41.2	54	12.8	PASS
1	7.2	55.7	100	H	74	18.3	37.6	54	16.4	PASS
1	8.1	52.0	100	H	74	22.0	33.9	54	20.1	PASS
1	9.0	47.3	100	H	74	26.7	29.2	54	24.8	PASS
1	2.7	59.2	200	V	74	14.8	41.1	54	12.9	PASS
1	3.6	51.8	100	V	74	22.2	33.7	54	20.3	PASS
1	4.5	43.4	100	V	74	30.6	25.3	54	28.7	PASS
1	5.4	59.3	100	V	74	14.7	41.2	54	12.8	PASS
1	8.1	55.2	100	V	74	18.8	37.1	54	16.9	PASS
27	2.7	50.1	100	H	74	23.9	32.0	54	22.0	PASS
27	3.7	45.2	100	H	74	28.8	27.1	54	26.9	PASS
27	5.5	54.1	100	H	74	19.9	36.0	54	18.0	PASS
27	6.4	59.9	200	H	74	14.1	41.8	54	12.2	PASS
27	7.3	54.4	100	H	74	19.6	36.3	54	17.7	PASS
27	8.2	52.7	100	H	74	21.3	34.6	54	19.4	PASS
27	9.2	47.2	100	H	74	26.8	29.1	54	24.9	PASS
27	2.7	51.1	100	V	74	22.9	33.1	54	20.9	PASS
27	3.7	46.5	100	V	74	27.5	28.4	54	25.6	PASS
27	4.6	43.8	100	V	74	30.2	25.8	54	28.2	PASS
27	5.5	56.3	100	V	74	17.7	38.2	54	15.8	PASS
27	6.4	55.9	100	V	74	18.1	37.8	54	16.2	PASS
27	7.3	51.7	100	V	74	22.3	33.6	54	20.4	PASS
27	8.2	55.3	100	V	74	18.7	37.3	54	16.7	PASS
27	9.2	45.9	100	V	74	28.1	27.8	54	26.2	PASS
52	2.8	51.6	100	H	74	22.4	33.6	54	20.4	PASS
52	3.7	45.5	100	H	74	28.5	27.4	54	26.6	PASS
52	4.6	43.7	100	H	74	30.3	25.7	54	28.3	PASS
52	5.6	53.8	100	H	74	20.2	35.8	54	18.2	PASS
52	6.5	61.4	200	H	74	12.6	43.3	54	10.7	PASS
52	7.4	55.4	100	H	74	18.6	37.3	54	16.7	PASS
52	8.3	54.4	100	H	74	19.6	36.4	54	17.6	PASS
52	9.3	48.2	100	H	74	25.8	30.1	54	23.9	PASS
52	2.8	47.0	100	V	74	27.0	28.9	54	25.1	PASS
52	3.7	46.8	100	V	74	27.2	28.7	54	25.3	PASS
52	4.6	44.7	100	V	74	29.3	26.6	54	27.4	PASS
52	5.6	56.3	100	V	74	17.7	38.2	54	15.8	PASS
52	6.5	57.0	100	V	74	17.0	38.9	54	15.1	PASS
52	7.4	50.6	400	V	74	23.4	32.5	54	21.5	PASS
52	8.3	56.8	100	V	74	17.2	38.7	54	15.3	PASS

Note :
Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss – Ext. Pre amplifier Gain (dB)
Duty Cycle Correction Factor is calculated using the guidelines provided in DA 00-705 (Spurious Radiated Emissions)
Duty Cycle correction Factor = $20 \log (1.560 \times 8 / 100) = -18.08 \text{ dB}$
Duty Cycle Factor = $20 \log (\text{Dwell time} / 100 \text{ msec})$, Number of Transmission for 100 msec: 8, Dwell time per Transmission: 1.560 msec

TEST RESULT – 1 GHz to 10 GHz							NON RESTRICTED BAND - PEAK		
Channel	Measured Fundamental	Spurious Emission	Measured Harmonic	Height	Ant Pol	Azimuth	Limit [Fundamental – 20 dBc]	Margin	Results
#	dBμV/m	GHz	dBμV/m	cm	H / V		dBμV/m	dB	
1	103.9	1.81	67.25	100	H	88.0	83.90	16.65	PA SS
1	103.9	1.81	66.68	200	V	66.0	83.90	17.22	PA SS
27	104.4	1.83	53.32	100	H	88.0	84.40	31.08	PA SS
27	104.4	1.83	52.5	100	V	44.0	84.40	31.90	PA SS
52	104.8	1.85	48.51	400	H	66.0	84.80	36.29	PA SS
52	104.8	1.85	46.48	100	V	88.0	84.80	38.32	PA SS
Note : Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)									

TEST SETUP PHOTOGRAPHS
Refer Annexure -1 Radiated Emission Test Setup

5 DTS CHANNELS

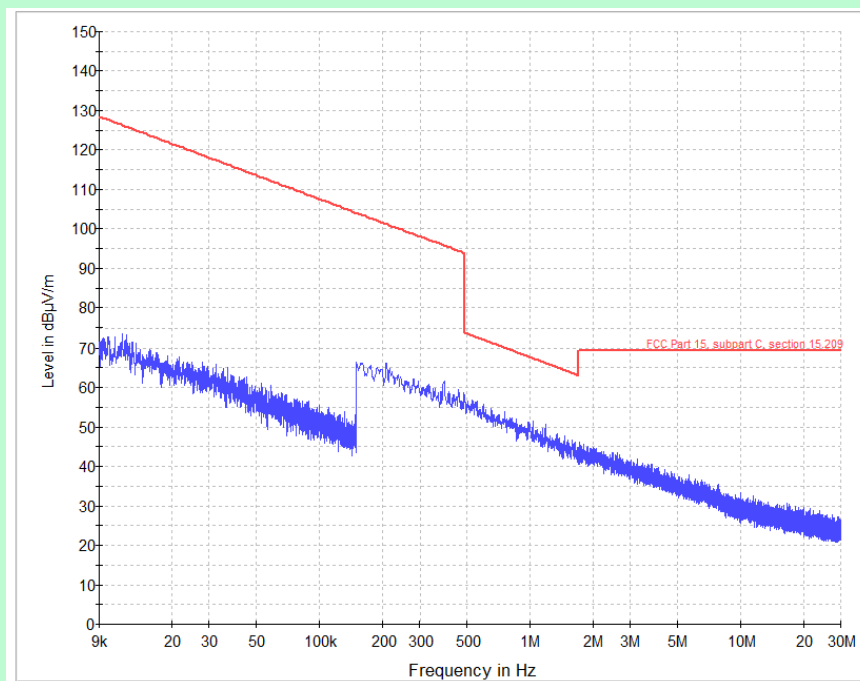
5.1 SPURIOUS RADIATED EMISSIONS

EUT Nomenclature	Wireless Smoke Detector	Test Report No.	EMC-0004-1
Model No.	FWH-200FIX135	Serial No.	01
Test Start Date	22-Oct-2013	Temperature (°C)	24.1
Test End Date	14- Dec-2013	Humidity RH (%)	55.8
Tested By	Gulshan Kumar	Pressure (mbar)	NR
Input Voltage / Freq	3.3Vdc		
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	04-Feb-2014
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	31-Dec-2013
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	00064055	07-Nov-2013
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	30-Nov-2013
Y	Loop Antenna	ETS Lindgren	6507	000103694	12-Mar-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1A	09-May-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1B	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2A	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2B	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

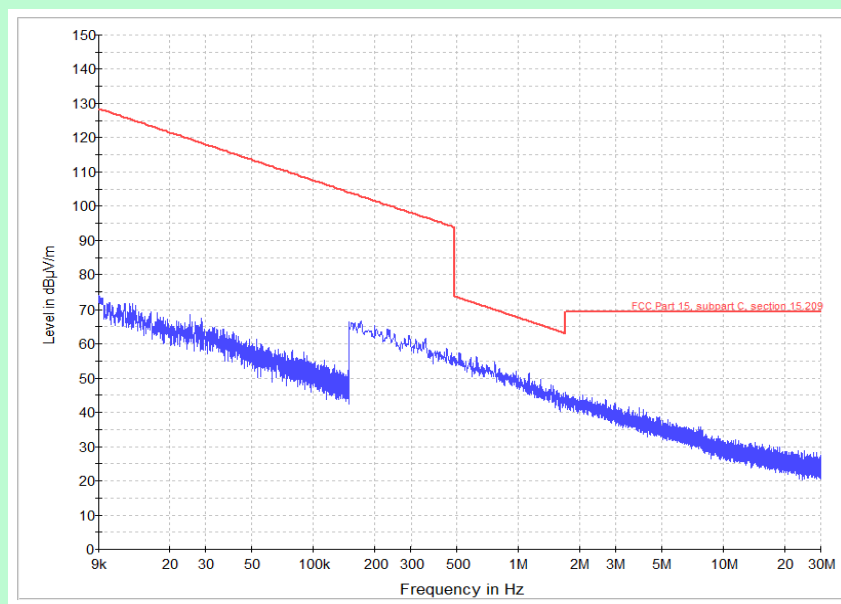
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – 9 KHz to 30 MHz



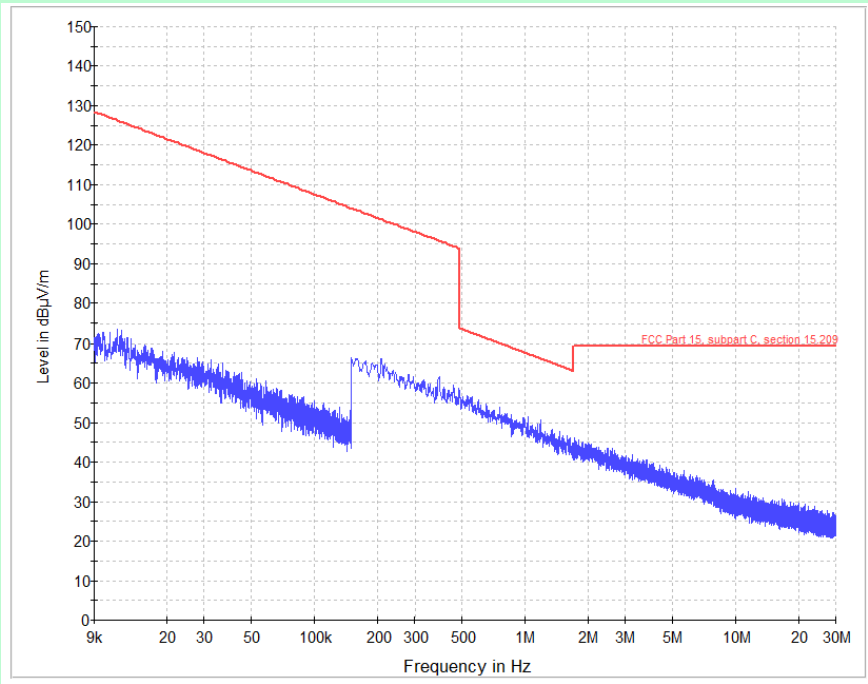
Channel 1 (902.875 MHz)

Note : Peak Graph - Parallel



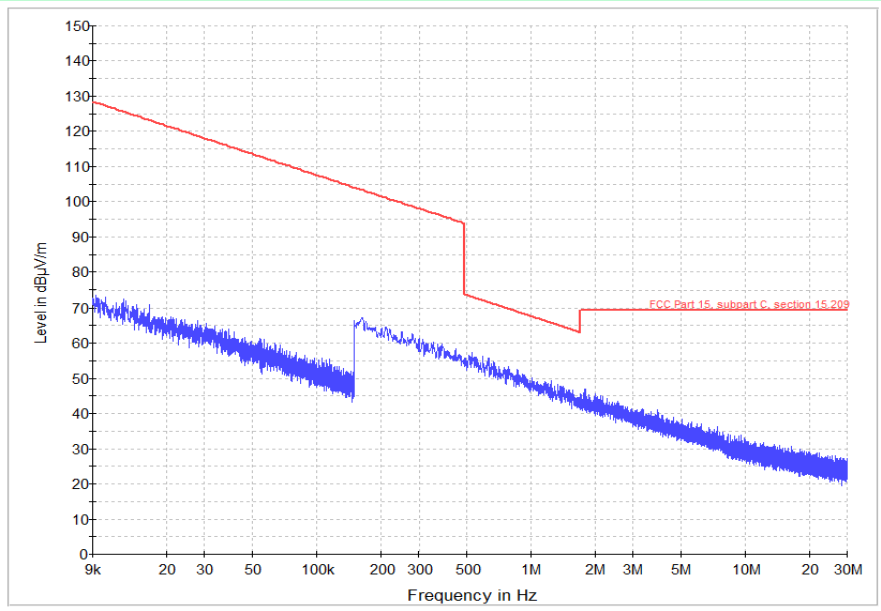
Channel 1 (902.875 MHz)

Note : Peak Graph - Perpendicular



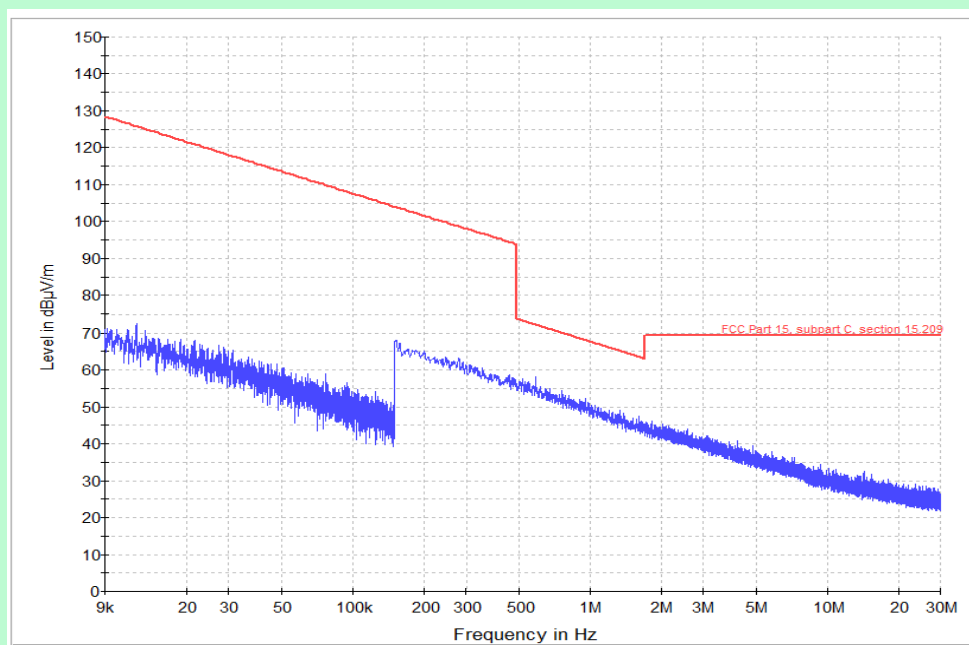
Channel 2 (908.425MHz)

Note : Peak Graph - Parallel

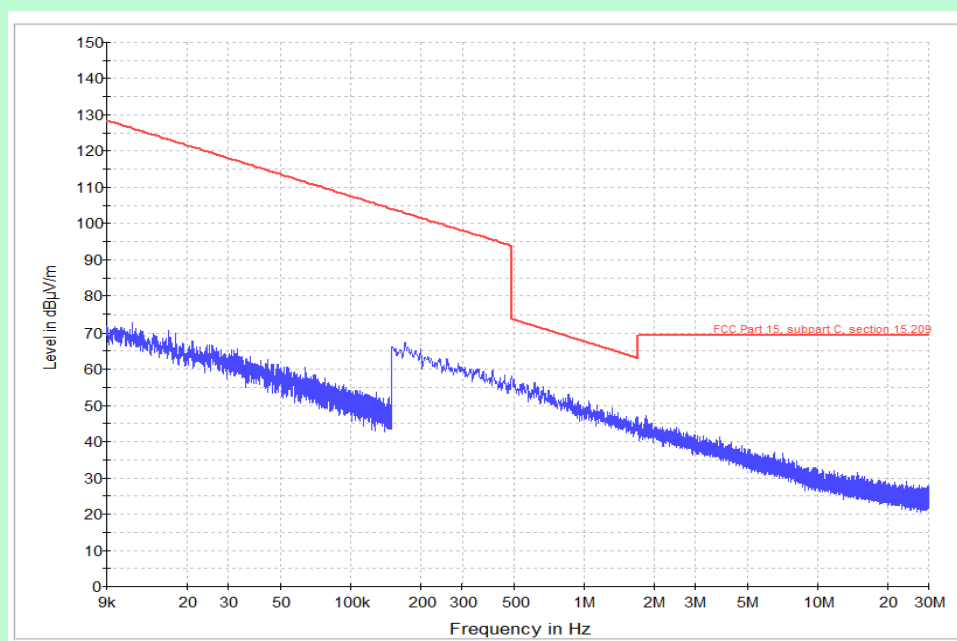


Channel 2 (908.425MHz)

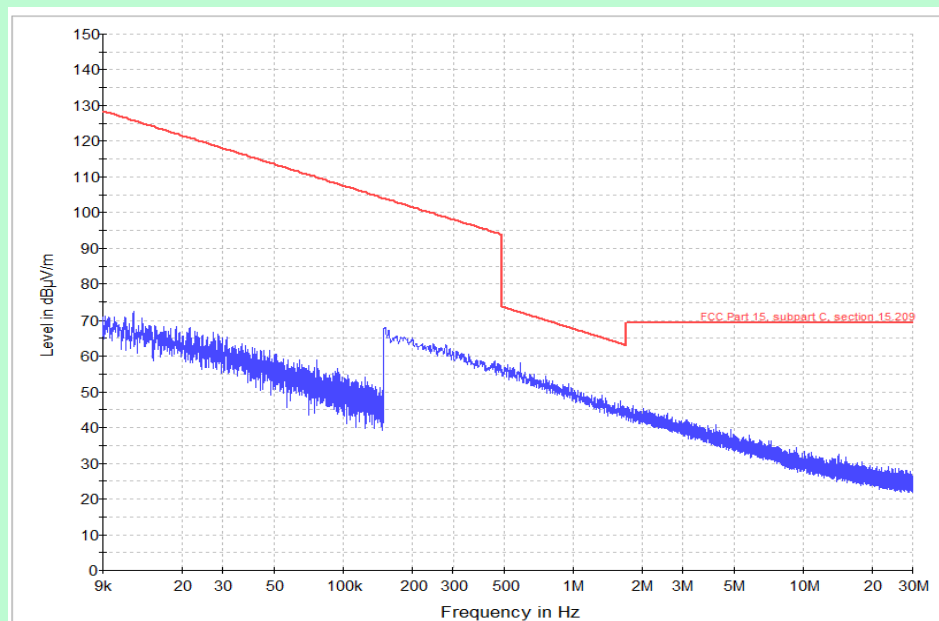
Note : Peak Graph - Perpendicular

**Channel 3 (914.325 MHz)**

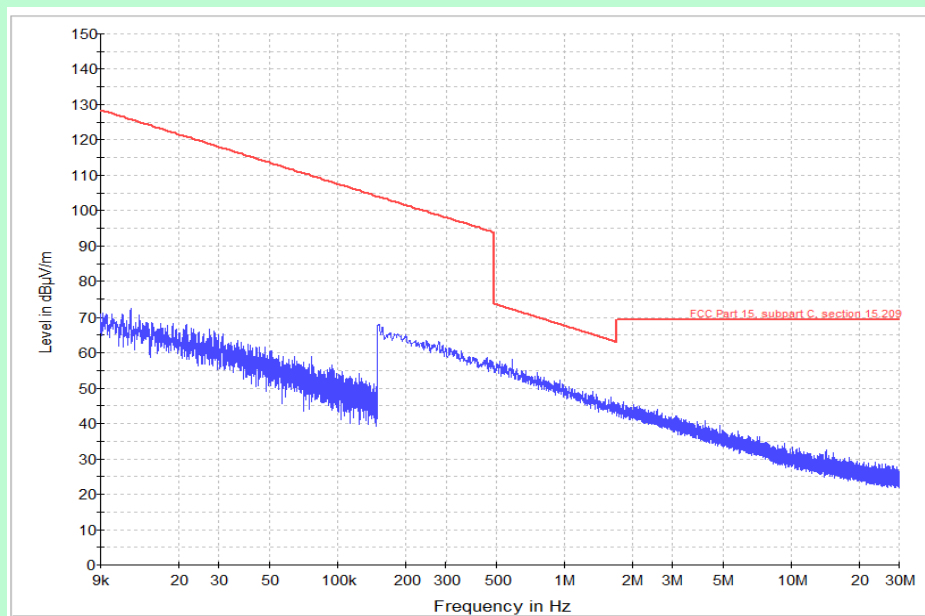
Note : Peak Graph - Parallel

**Channel 3 (914.325 MHz)**

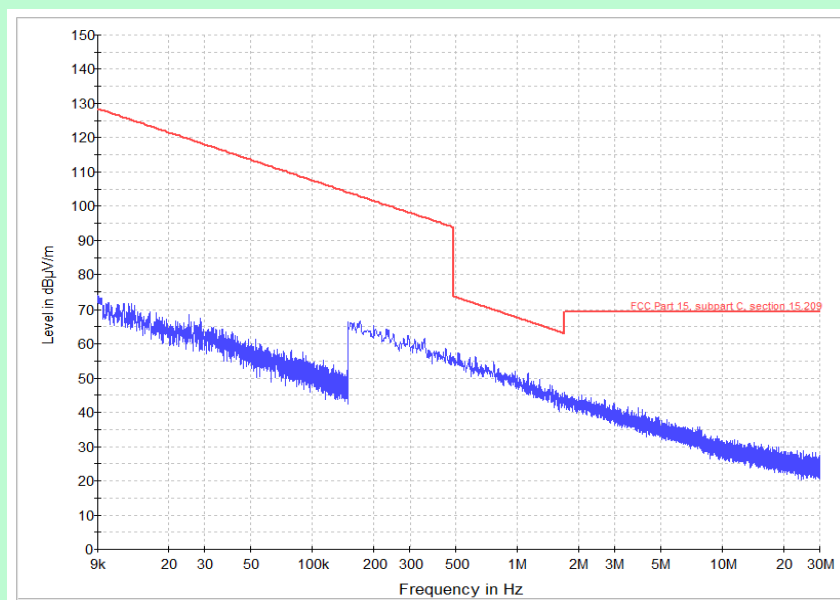
Note : Peak Graph - Perpendicular

**Channel 4 (915.325 MHz)**

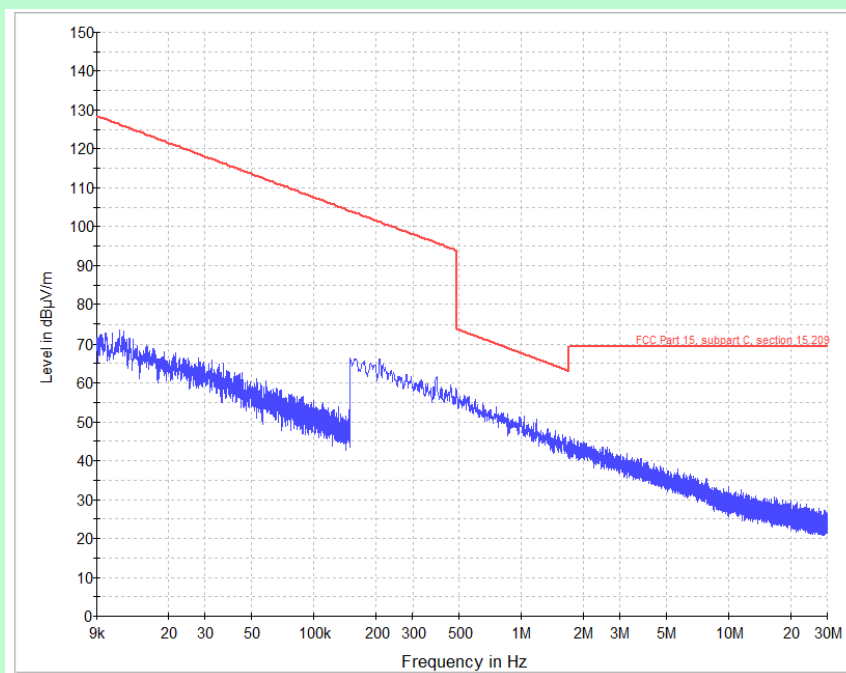
Note : Peak Graph - Parallel

**Channel 4 (915.325 MHz)**

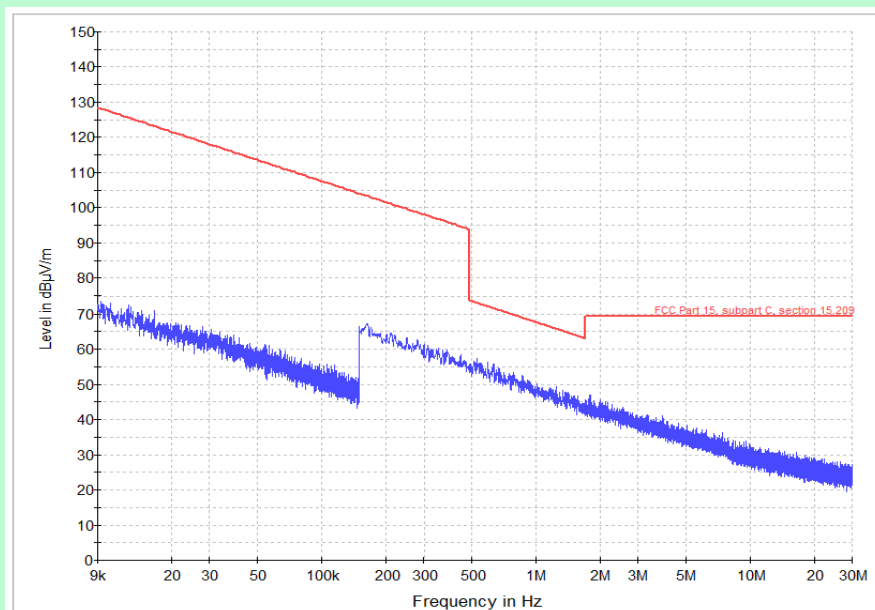
Note : Peak Graph - Perpendicular

**Channel 5 (921.575 MHz)**

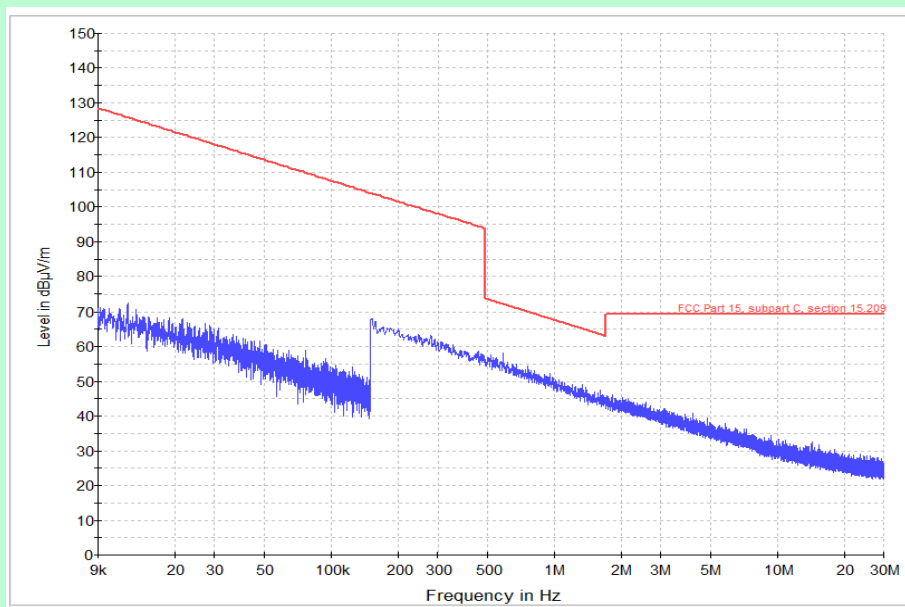
Note : Peak Graph - Perpendicular

**Channel 5 (921.575 MHz)**

Note : Peak Graph - Parallel

**Channel 6 (927.125 MHz)**

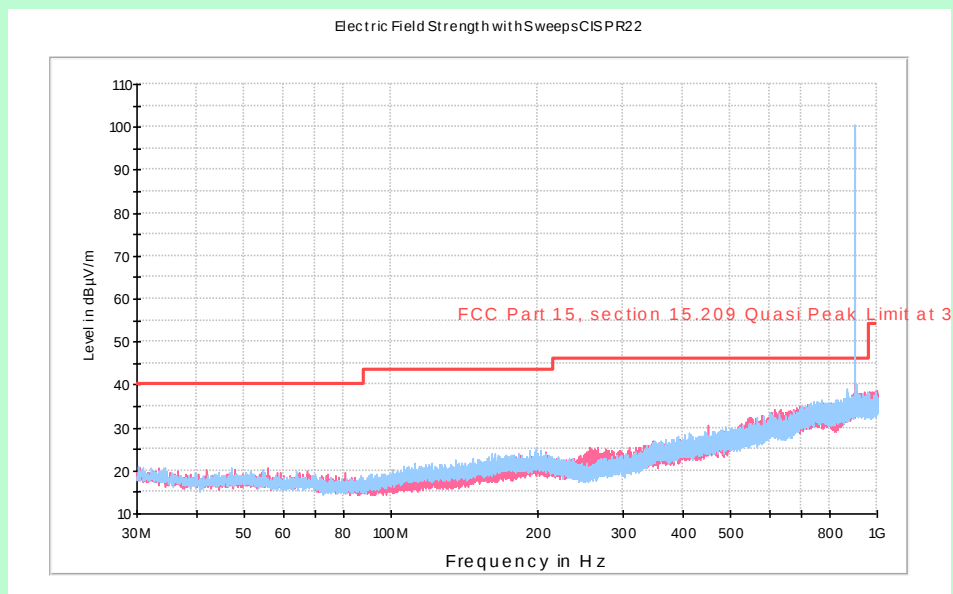
Note : Peak Graph - Perpendicular

**Channel 6 (927.125 MHz)**

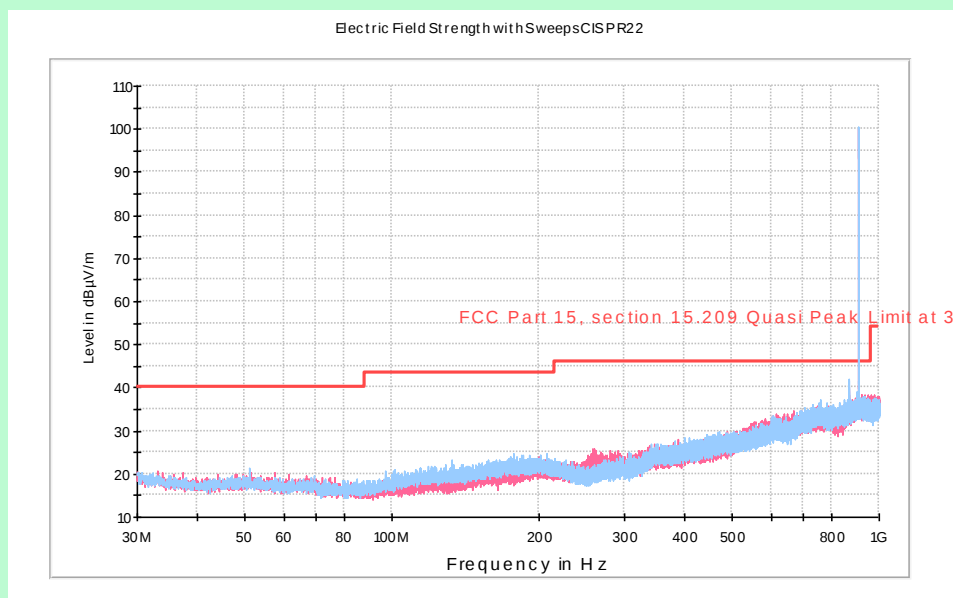
Note : Peak Graph - Parallel

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 FOUND									PASS
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

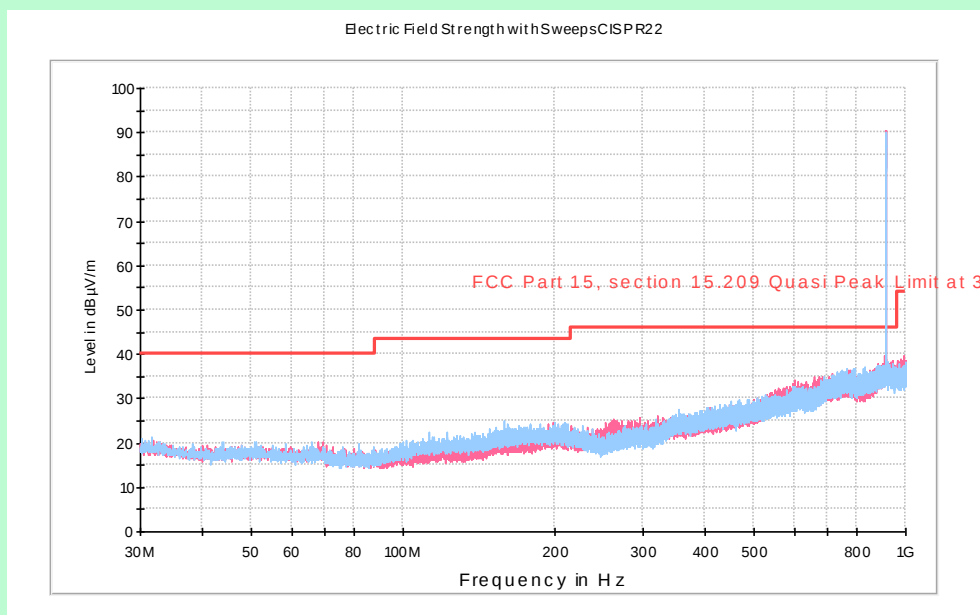
TEST GRAPHS – 30 MHz to 1 GHz

**Channel 1 (902.875 MHz)**

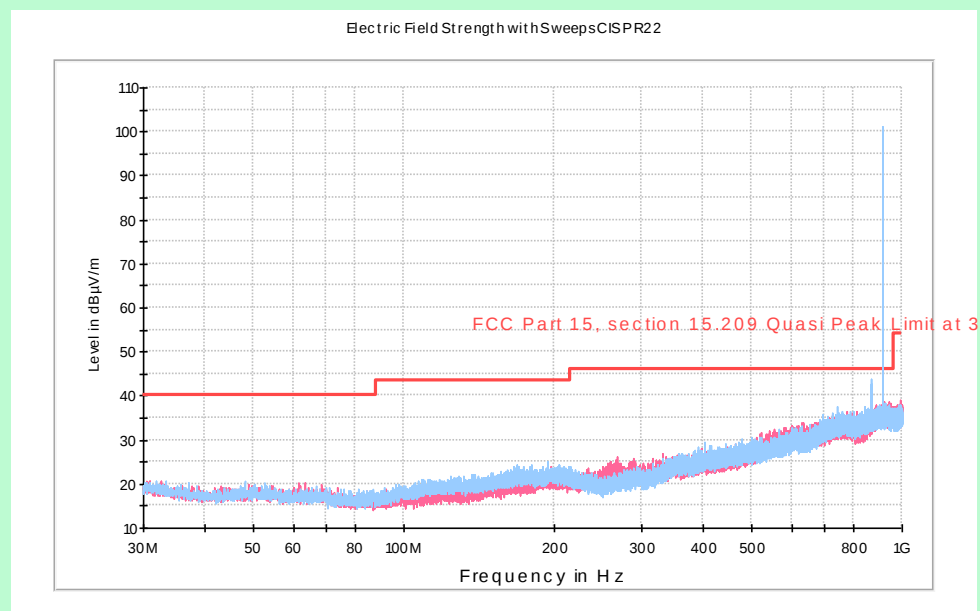
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 2 (908.425 MHz)**

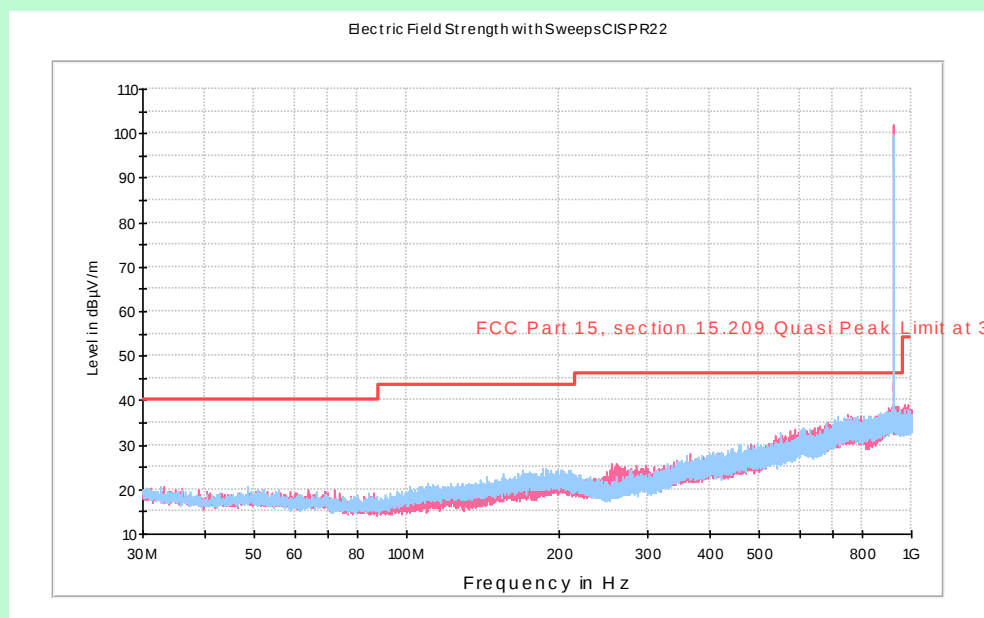
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 3 (914.325 MHz)**

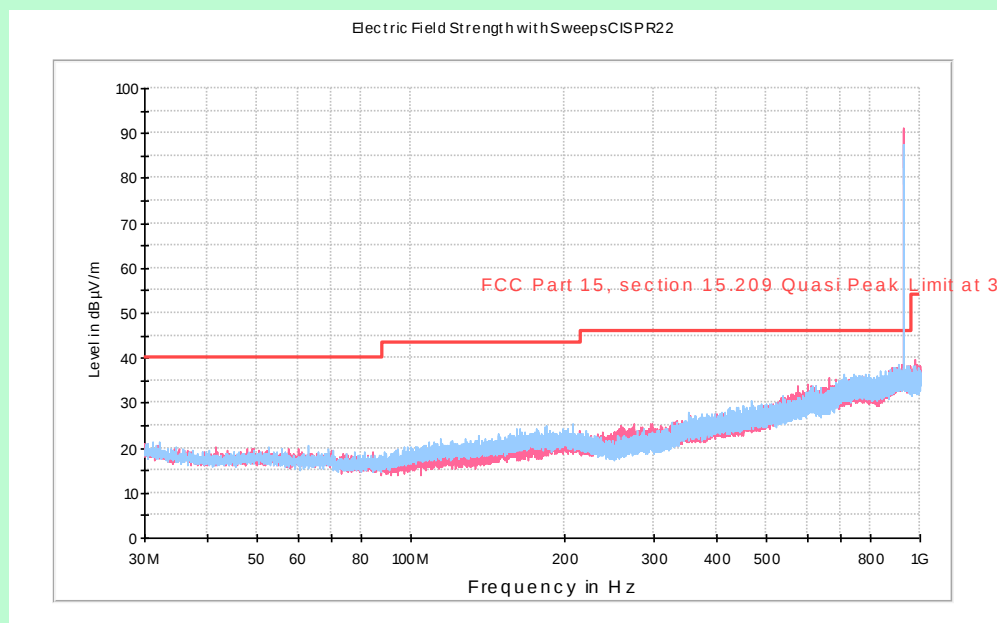
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 4 (915.325 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 5 (921.575 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

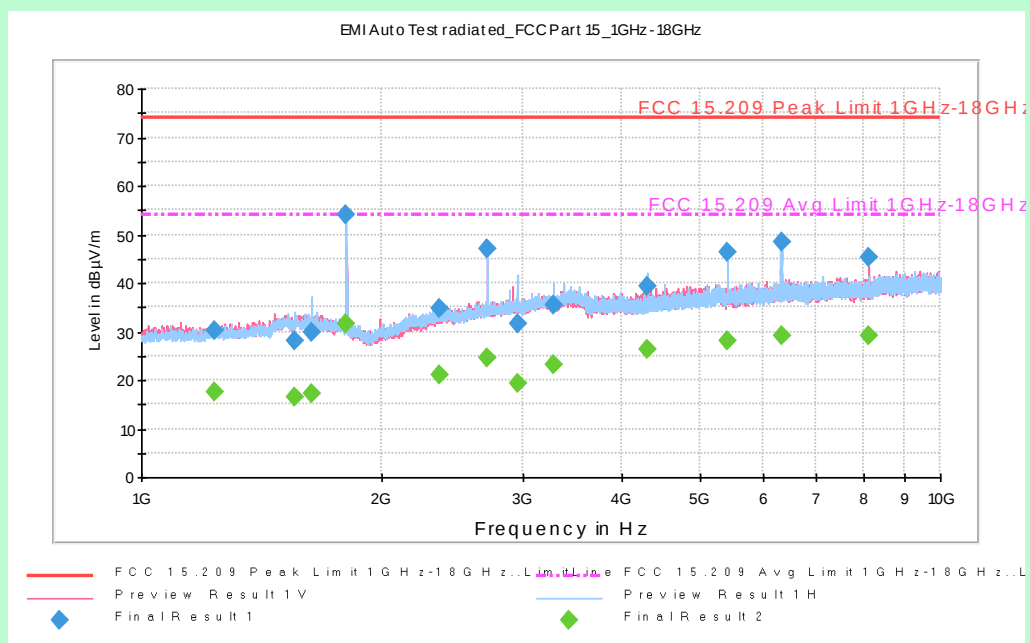
**Channel 6 (927.125 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

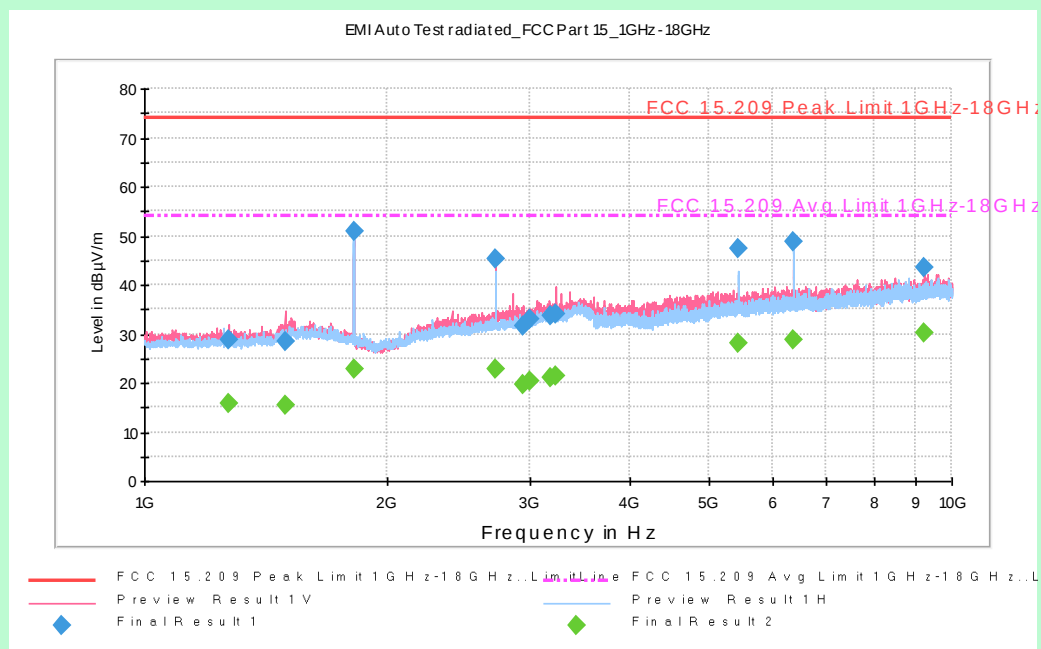
TEST RESULT – 30 MHz to 1 GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	cm	H / V	deg	dB	dBµV/m	
1	30.84	19.4	100	V	330	20.6	40	PASS
1	33.33	19	200	V	90	21	40	PASS
1	112.67	20.1	100	H	90	23.4	43.5	PASS
1	192.74	23.1	300	H	0	20.4	43.5	PASS
1	198.44	23.5	100	H	240	20	43.5	PASS
1	448.66	28	400	H	300	18	46	PASS
1	488.37	28.7	100	H	240	17.3	46	PASS
1	866.81	35.8	100	V	90	10.2	46	PASS
1	902.72	100.7	100	H	0	-42.7	46	INTENDED FREQUENCY
2	50.90	18.4	100	V	0	21.6	40	PASS
2	177.32	23.2	300	H	0	20.3	43.5	PASS
2	208.09	23.1	100	H	210	20.4	43.5	PASS
2	468.91	27.8	100	V	30	18.2	46	PASS
2	487.99	28.8	200	H	0	17.2	46	PASS
2	757.01	35.5	100	H	60	10.5	46	PASS
2	865.72	35.7	400	V	210	10.3	46	PASS
2	866.67	36.1	100	H	240	9.9	46	PASS
2	908.27	99.7	100	H	0	-41.5	46	INTENDED FREQUENCY
3	30.88	19.4	100	V	300	20.6	40	PASS
3	159.57	22.3	300	H	0	21.2	43.5	PASS
3	484.58	28.8	100	H	30	17.2	46	PASS
3	487.89	28.2	200	V	330	17.8	46	PASS
3	790.22	35.2	100	H	240	10.8	46	PASS
3	825.64	35.5	100	H	270	10.5	46	PASS
3	906.75	37.1	300	H	120	8.9	46	PASS
3	914.17	89.7	100	H	0	-31.7	46	INTENDED FREQUENCY
3	994.12	37.9	100	V	60	16.1	54	PASS
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

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	
4	194.45	23.2	100.0	H	270.0	20.3	43.5	PASS
4	475.47	28.6	200.0	H	150.0	17.4	46.0	PASS
4	477.76	28.7	100.0	H	0.0	17.3	46.0	PASS
4	742.54	35.4	100.0	H	0.0	10.6	46.0	PASS
4	865.72	35.7	300.0	V	30.0	10.3	46.0	PASS
4	866.33	36.1	100.0	H	330.0	9.9	46.0	PASS
4	866.52	36.2	100.0	H	0.0	9.8	46.0	PASS
4	867.30	36.2	400.0	H	180.0	9.8	46.0	PASS
5	915.17	100.9	100.0	H	0.0	-42.9	46.0	INTENDED FREQUENCY
5	31.70	19.5	200.0	H	180.0	20.5	40.0	PASS
5	32.34	19.2	100.0	V	270.0	20.8	40.0	PASS
5	109.96	20.0	300.0	H	210.0	23.5	43.5	PASS
5	186.65	23.0	100.0	H	270.0	20.5	43.5	PASS
5	189.97	22.9	300.0	H	180.0	20.6	43.5	PASS
5	255.93	23.4	100.0	V	240.0	22.6	46.0	PASS
5	453.93	28.2	100.0	H	180.0	17.8	46.0	PASS
5	482.32	28.7	200.0	H	0.0	17.3	46.0	PASS
5	921.42	101.3	100.0	V	120.0	-43.3	46.0	INTENDED FREQUENCY
6	32.45	19.2	100.0	V	330.0	20.8	40.0	PASS
6	184.33	23.2	100.0	H	270.0	20.3	43.5	PASS
6	208.92	23.1	300.0	H	240.0	20.4	43.5	PASS
6	465.71	28.5	100.0	H	0.0	17.5	46.0	PASS
6	488.22	28.8	100.0	H	0.0	17.2	46.0	PASS
6	575.91	31.5	300.0	V	240.0	14.5	46.0	PASS
6	663.66	33.4	100.0	V	60.0	12.6	46.0	PASS
6	926.97	89.4	100.0	V	60.0	-31.4	46.0	INTENDED FREQUENCY
6	979.65	37.8	100.0	V	90.0	16.2	54.0	PASS
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

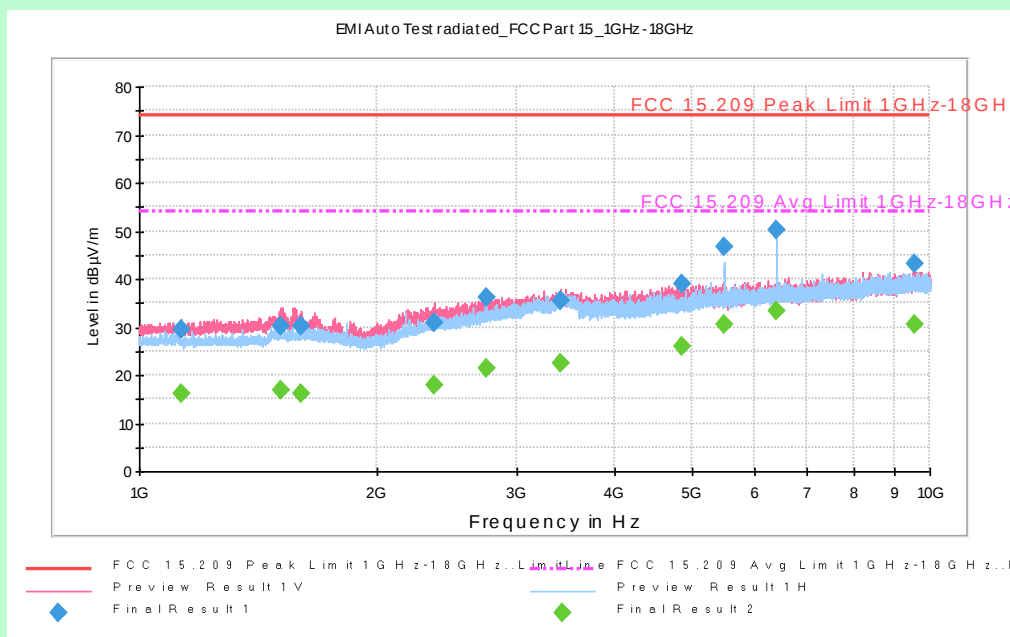
TEST GRAPHS – 1 GHz to 10 GHz



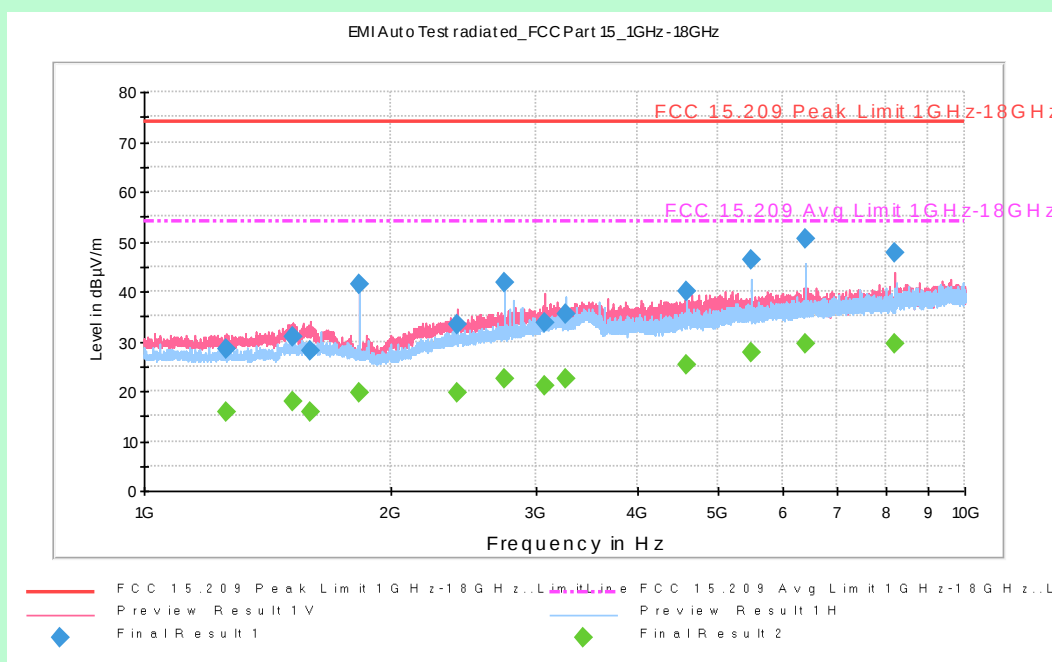
Channel 1 (902.875 MHz)



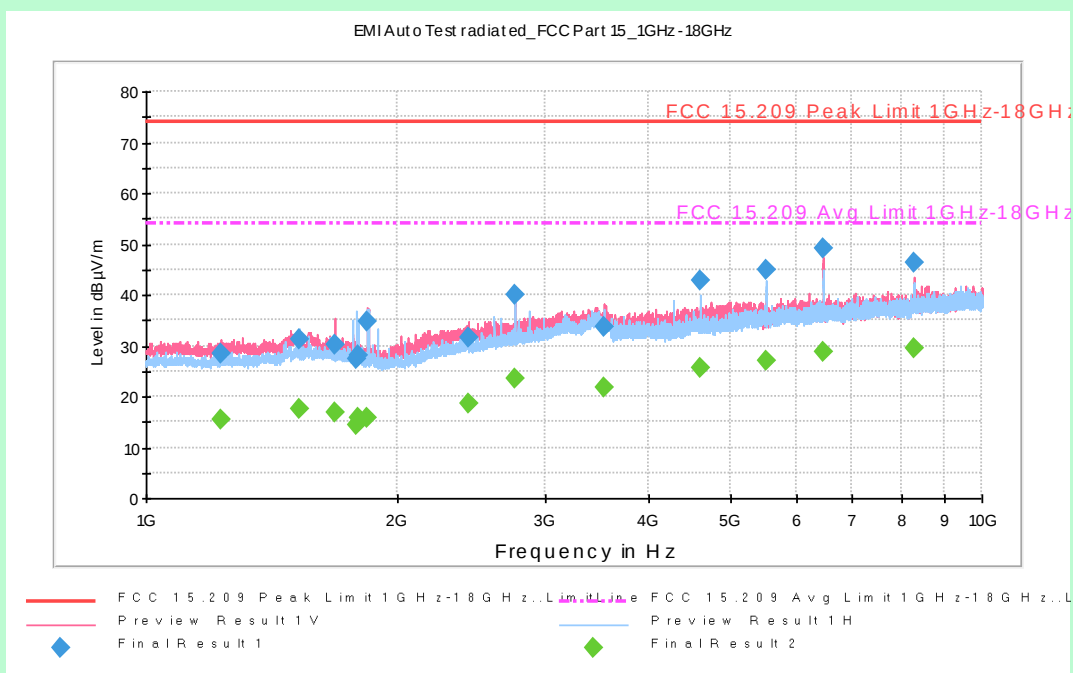
Channel 2 (908.425 MHz)



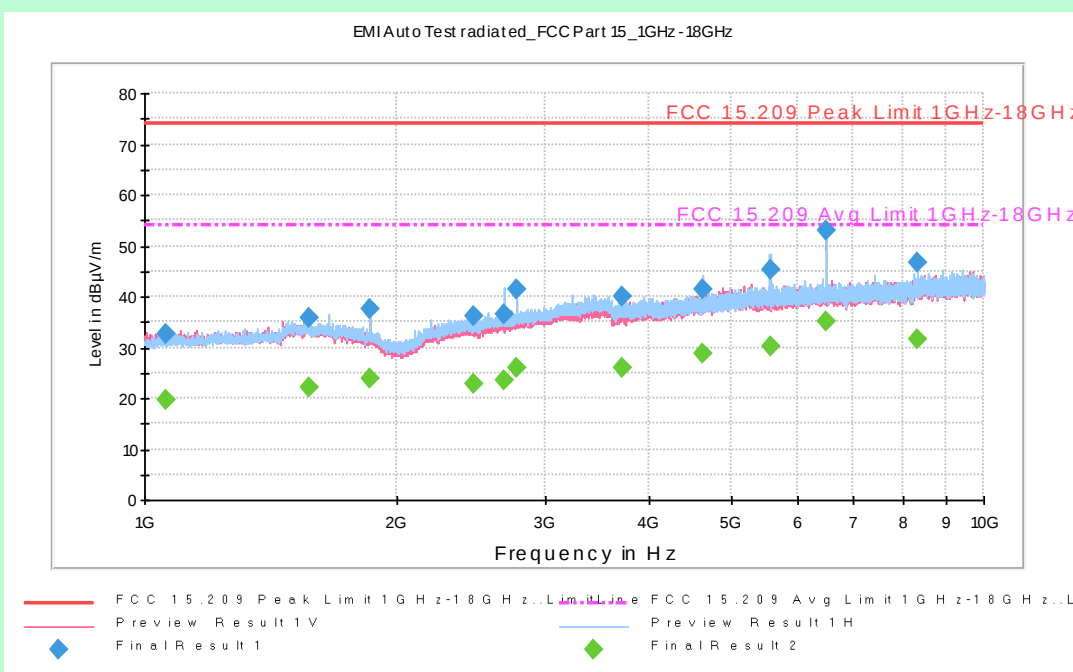
Channel 3 (914.325 MHz)



Channel 4 (915.325 MHz)



Channel 5 (921.575 MHz)



Channel 6 (927.125 MHz)

TEST RESULT –1 GHz to 10 GHz					RESTRICTED BAND – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H /V	(deg)	(dB)	(dBμV/m)
1	1235.8	30.3	400.0	V	110.0	43.7	74.0
1	1558.5	28.2	400.0	V	22.0	45.8	74.0
1	1634.1	30.0	400.0	V	22.0	44.0	74.0
1	1805.1	54.1	400.0	H	66.0	24.3	74.0
1	2358.6	34.6	400.0	V	198.0	39.4	74.0
1	2708.2	47.1	400.0	V	198.0	29.7	74.0
1	2952.6	31.5	400.0	V	66.0	42.5	74.0
1	3281.1	35.4	400.0	V	22.0	38.6	74.0
1	4288.6	39.3	400.0	V	110.0	34.7	74.0
1	5415.9	46.5	200.0	H	66.0	27.5	74.0
1	6322.2	48.5	100.0	H	22.0	25.5	74.0
1	8128.5	45.4	100.0	V	22.0	28.6	74.0
2	1270.3	28.8	390.0	V	22.0	45.2	74.0
2	1492.2	28.5	390.0	V	0.0	45.5	74.0
2	1816.0	50.8	300.0	H	110.0	23.2	74.0
2	2724.7	45.3	200.0	V	0.0	28.7	74.0
2	2950.8	31.6	390.0	V	110.0	42.4	74.0
2	3006.0	33.1	390.0	V	330.0	40.9	74.0
2	3182.0	33.8	390.0	V	66.0	40.2	74.0
2	3233.0	34.2	390.0	V	330.0	39.8	74.0
2	5452.3	47.5	200.0	H	308.0	26.5	74.0
2	6361.0	48.9	100.0	H	44.0	25.1	74.0
2	9263.7	43.5	200.0	H	264.0	30.5	74.0
2	12655.2	46.8	200.0	H	154.0	27.2	74.0
2	17537.6	53.1	200.0	V	308.0	20.9	74.0
3	1130.1	29.4	390.0	V	242.0	44.6	74.0
3	1508.5	30.1	390.0	V	110.0	43.9	74.0
3	1603.0	30.1	390.0	V	242.0	43.9	74.0
3	2359.5	31.0	390.0	V	198.0	43.0	74.0
3	2743.8	36.1	200.0	H	308.0	37.9	74.0
3	3413.8	35.3	390.0	V	242.0	38.7	74.0
3	4870.0	39.0	390.0	V	154.0	35.0	74.0
3	5484.3	46.5	200.0	H	308.0	27.5	74.0
3	6401.8	50.2	100.0	H	44.0	23.8	74.0
3	9575.2	43.0	300.0	H	308.0	31.0	74.0
Note : 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 – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H/V	(deg)	(dB)	(dBμV/m)
4	1256.5	28.5	390.0	V	330.0	45.5	74.0
4	1516.6	30.8	390.0	V	110.0	43.2	74.0
4	1595.8	28.2	390.0	V	22.0	45.8	74.0
4	1830.3	41.3	300.0	H	308.0	32.7	74.0
4	2407.2	33.2	390.0	V	242.0	40.8	74.0
4	2745.6	41.8	390.0	V	198.0	32.2	74.0
4	3071.8	33.7	390.0	V	22.0	40.3	74.0
4	3267.6	35.5	390.0	V	286.0	38.5	74.0
4	4574.8	40.2	200.0	H	44.0	33.8	74.0
4	5490.1	46.3	200.0	H	308.0	27.7	74.0
4	6405.4	50.4	100.0	H	44.0	23.6	74.0
4	8236.0	47.6	100.0	V	22.0	26.4	74.0
5	1226.8	28.5	390.0	V	66.0	45.5	74.0
5	1523.4	31.2	390.0	V	242.0	42.8	74.0
5	1682.2	30.0	390.0	V	242.0	44.0	74.0
5	1783.9	27.5	100.0	V	0.0	46.5	74.0
5	1790.7	28.1	390.0	V	330.0	45.9	74.0
5	1842.4	34.7	200.0	V	0.0	39.3	74.0
5	2427.4	31.7	390.0	V	330.0	42.3	74.0
5	2763.6	40.1	200.0	H	264.0	38.2	74.0
5	3538.5	33.8	390.0	V	110.0	40.2	74.0
5	4606.3	42.7	200.0	H	264.0	31.3	74.0
5	5527.5	44.9	200.0	H	88.0	29.1	74.0
5	6452.7	49.0	100.0	H	44.0	25.0	74.0
5	8297.2	46.3	100.0	V	352.0	27.7	74.0
6	1060.3	32.6	390.0	V	110.0	41.4	74.0
6	1568.8	35.8	390.0	V	154.0	38.2	74.0
6	1854.6	37.6	200.0	V	0.0	36.4	74.0
6	2463.0	36.0	390.0	V	154.0	38.0	74.0
6	2684.8	36.6	390.0	V	198.0	37.4	74.0
6	2780.2	41.5	390.0	H	286.0	32.5	74.0
6	3709.5	39.9	200.0	V	0.0	34.1	74.0
6	4635.6	41.6	390.0	V	330.0	32.4	74.0
6	5563.9	45.4	200.0	H	44.0	28.6	74.0
6	6487.8	52.8	100.0	H	44.0	21.2	74.0
6	8341.8	46.8	100.0	V	44.0	27.2	74.0
Note : 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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H/V	(deg)	(dB)	(dBμV/m)
1	1235.8	17.4	400.0	V	110.0	36.6	54.0
1	1558.5	16.4	400.0	V	22.0	37.6	54.0
1	1634.1	17.3	400.0	V	22.0	36.7	54.0
1	1805.1	31.7	400.0	H	66.0	29.4	54.0
1	2358.6	21.2	400.0	V	198.0	32.8	54.0
1	2708.2	24.4	400.0	V	198.0	29.6	54.0
1	2952.6	19.4	400.0	V	66.0	34.6	54.0
1	3281.1	23.0	400.0	V	22.0	31.0	54.0
1	4288.6	26.1	400.0	V	110.0	27.9	54.0
1	5415.9	28.1	200.0	H	66.0	25.9	54.0
1	6322.2	29.0	100.0	H	22.0	25.0	54.0
1	8128.5	29.2	100.0	V	22.0	24.8	54.0
1	1270.3	15.7	390.0	V	22.0	38.3	54.0
2	1492.2	15.6	390.0	V	0.0	38.4	54.0
2	1816.0	22.7	300.0	H	110.0	31.3	54.0
2	2724.7	22.7	200.0	V	0.0	31.3	54.0
2	2950.8	19.6	390.0	V	110.0	34.4	54.0
2	3006.0	20.2	390.0	V	330.0	33.8	54.0
2	3182.0	21.0	390.0	V	66.0	33.0	54.0
2	3233.0	21.4	390.0	V	330.0	32.6	54.0
2	5452.3	28.2	200.0	H	308.0	25.8	54.0
2	6361.0	28.9	100.0	H	44.0	25.1	54.0
2	9263.7	30.3	200.0	H	264.0	23.7	54.0
2	12655.2	34.0	200.0	H	154.0	20.0	54.0
2	17537.6	40.2	200.0	V	308.0	13.8	54.0
3	1130.1	16.0	390.0	V	242.0	38.0	54.0
3	1508.5	16.9	390.0	V	110.0	37.1	54.0
3	1603.0	16.1	390.0	V	242.0	37.9	54.0
3	2359.5	17.7	390.0	V	198.0	36.3	54.0
3	2743.8	21.4	200.0	H	308.0	32.6	54.0
3	3413.8	22.5	390.0	V	242.0	31.5	54.0
3	4870.0	25.9	390.0	V	154.0	28.1	54.0
3	5484.3	30.5	200.0	H	308.0	23.5	54.0
3	6401.8	33.2	100.0	H	44.0	20.8	54.0
3	9575.2	30.4	300.0	H	308.0	23.6	54.0

Note :
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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H/V	(deg)	(dB)	(dBμV/m)
4	1256.5	15.7	390.0	V	330.0	38.3	54.0
4	1516.6	18.0	390.0	V	110.0	36.0	54.0
4	1595.8	15.9	390.0	V	22.0	38.1	54.0
4	1830.3	19.7	300.0	H	308.0	34.3	54.0
4	2407.2	19.6	390.0	V	242.0	34.4	54.0
4	2745.6	22.5	390.0	V	198.0	31.5	54.0
4	3071.8	21.0	390.0	V	22.0	33.0	54.0
4	3267.6	22.5	390.0	V	286.0	31.5	54.0
4	4574.8	25.3	200.0	H	44.0	28.7	54.0
4	5490.1	27.7	200.0	H	308.0	26.3	54.0
4	6405.4	29.6	100.0	H	44.0	24.4	54.0
4	8236.0	29.6	100.0	V	22.0	24.4	54.0
5	1226.8	15.5	390.0	V	66.0	38.5	54.0
5	1523.4	17.7	390.0	V	242.0	36.3	54.0
5	1682.2	17.0	390.0	V	242.0	37.0	54.0
5	1783.9	14.3	100.0	V	0.0	39.7	54.0
5	1790.7	15.8	390.0	V	330.0	38.2	54.0
5	1842.4	15.7	200.0	V	0.0	38.3	54.0
5	2427.4	18.6	390.0	V	330.0	35.4	54.0
5	2763.6	23.5	200.0	H	264.0	34.5	54.0
5	3538.5	21.6	390.0	V	110.0	32.4	54.0
5	4606.3	25.7	200.0	H	264.0	28.3	54.0
5	5527.5	27.2	200.0	H	88.0	26.8	54.0
5	6452.7	28.9	100.0	H	44.0	25.2	54.0
5	8297.2	29.6	100.0	V	352.0	24.4	54.0
6	1060.3	19.7	390.0	V	110.0	34.3	54.0
6	1568.8	22.0	390.0	V	154.0	32.0	54.0
6	1854.6	23.9	200.0	V	0.0	30.1	54.0
6	2463.0	22.7	390.0	V	154.0	31.3	54.0
6	2684.8	23.5	390.0	V	198.0	30.5	54.0
6	2780.2	26.0	390.0	H	286.0	28.0	54.0
6	3709.5	25.9	200.0	V	0.0	28.1	54.0
6	4635.6	28.9	390.0	V	330.0	25.1	54.0
6	5563.9	30.3	200.0	H	44.0	23.7	54.0
6	6487.8	35.0	100.0	H	44.0	19.0	54.0
6	8341.8	31.7	100.0	V	44.0	22.3	54.0

Note :
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	Spurious Emission	Measured Harmonic	Height	Ant Pol	Azimuth	Limit [Fundamental – 20 dBc]	Margin	Results
#	dBμV/m	MHz	dBμV/m	cm	H / V	deg	dBμV/m	dB	
1	100.7	1805.1	54.1	200	H	88.0	80.70	26.60	PASS
2	99.7	1816.3	50.8	400	H	66.0	79.70	28.90	PASS
3	89.7	1828	50.1	300	H	88.0	69.70	19.60	PASS
4	100.9	1831.2	41.3	300	H	44.0	80.90	39.60	PASS
5	101.3	1842.4	34.6	300	H	66.0	81.30	46.70	PASS
6	89.5	1853.7	34.6	300	H	88.0	69.50	34.90	PASS
Note : Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)									

Wireless Photo Smoke Detector

6 FHSS CHANNELS

6.1 SPURIOUS RADIATED EMISSIONS

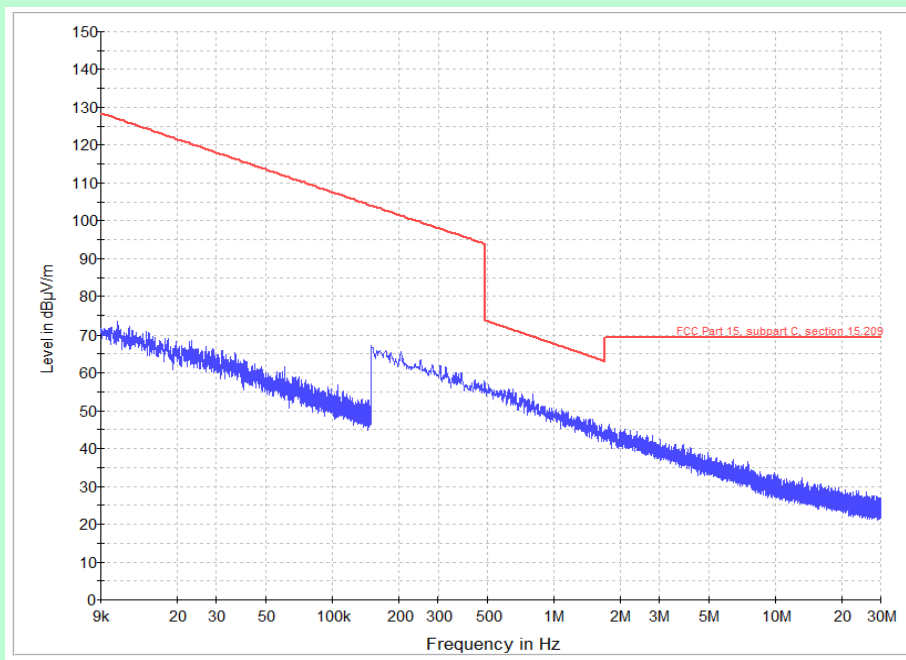
EUT Nomenclature	Wireless Smoke Detector	Test Report No.	EMC-0004-1
Model No.	FWD-200P	Serial No.	01
Test Start Date	22-Oct-2013	Temperature (°C)	23.5
Test End Date	31-Oct-2013	Humidity RH (%)	57.1
Tested By	Gulshan Kumar	Pressure (mbar)	NR
Input Voltage / Freq	3.3Vdc		
Operating Mode	Refer Page 5 Operating 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 15.247 and 15.209	Test Method	DA 00-705
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	04-Feb-2014
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	31-Dec-2013
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	00064055	07-Nov-2013
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	30-Nov-2013
Y	Loop Antenna	ETS Lindgren	6507	000103694	12-Mar-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1A	09-May-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1B	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2A	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2B	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	09-May-2014
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

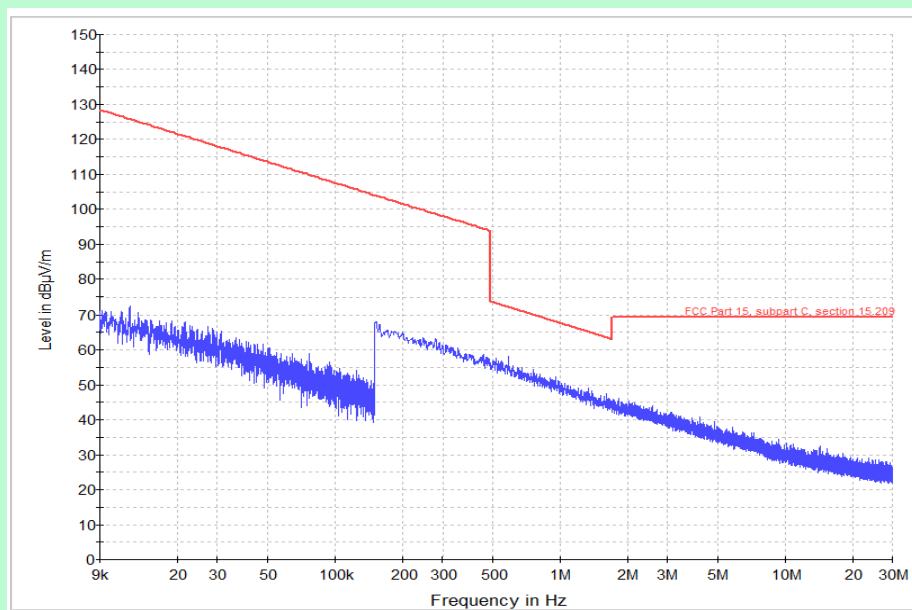
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

Test Graphs – 9 KHz to 30 MHz



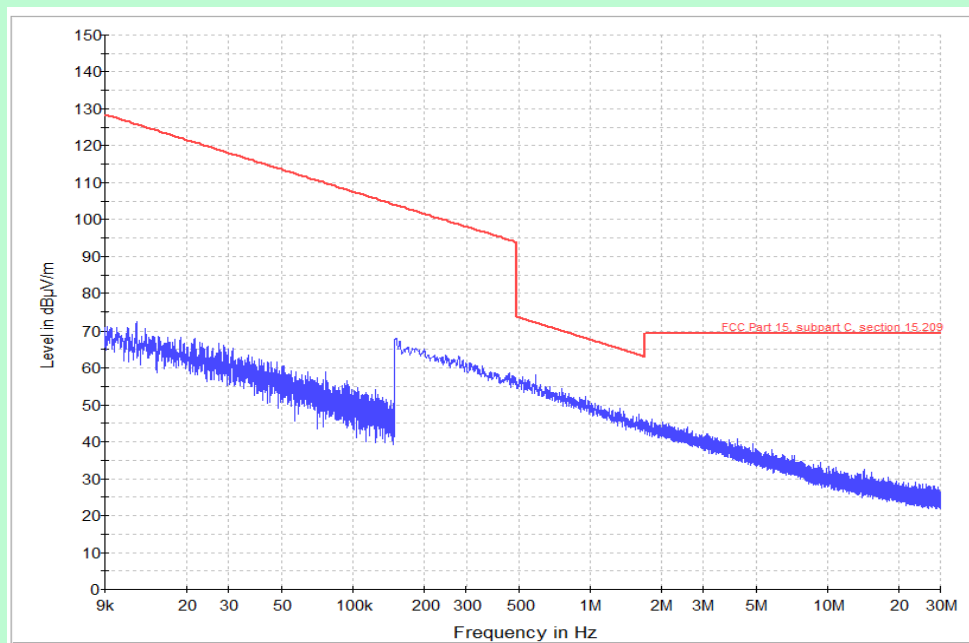
Channel 1 (903.55 MHz)

Note : Peak Graph - Parallel

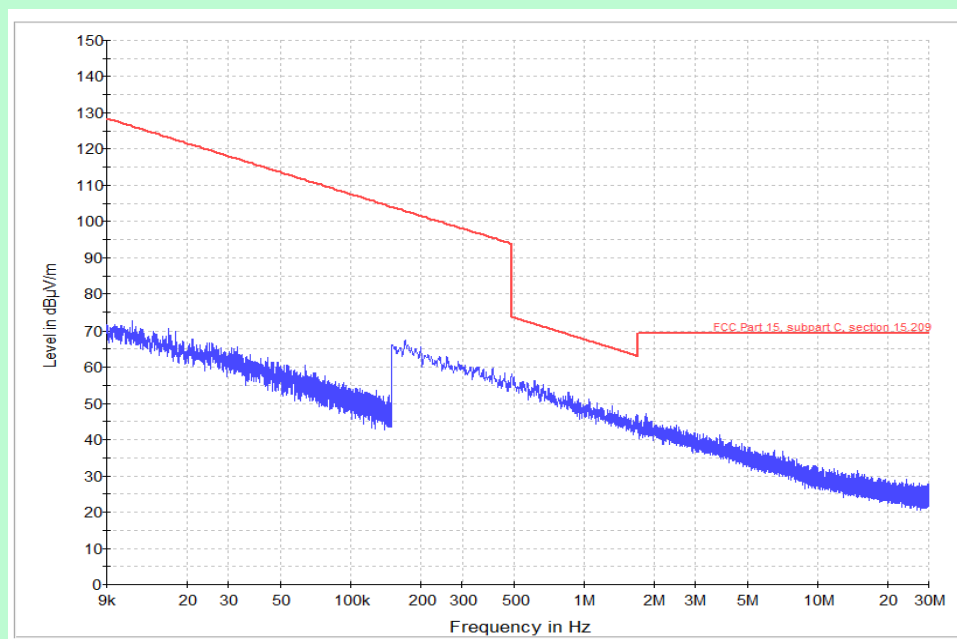


Channel 1 (903.55 MHz)

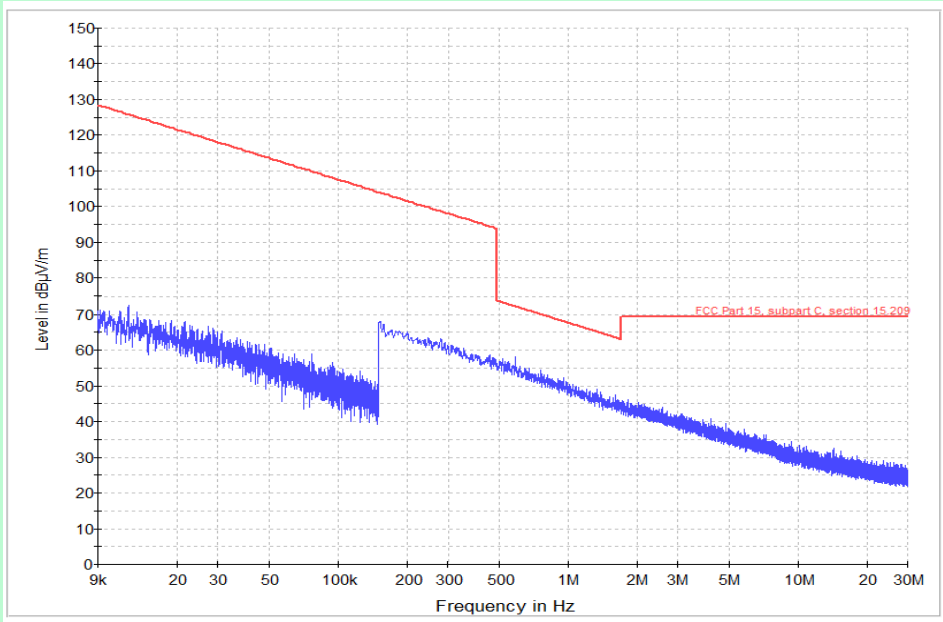
Note : Peak Graph - Perpendicular

**Channel 27 (916.35 MHz)**

Note : Peak Graph - Parallel

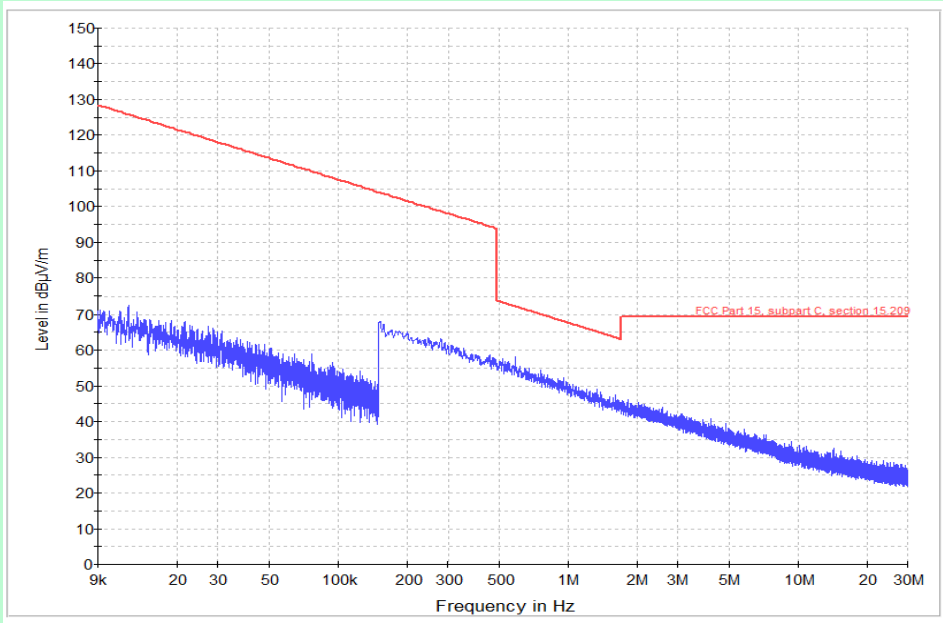
**Channel 27 (916.35 MHz)**

Note : Peak Graph - Perpendicular



Channel 52 (926.45 MHz)

Note : Peak Graph - Parallel



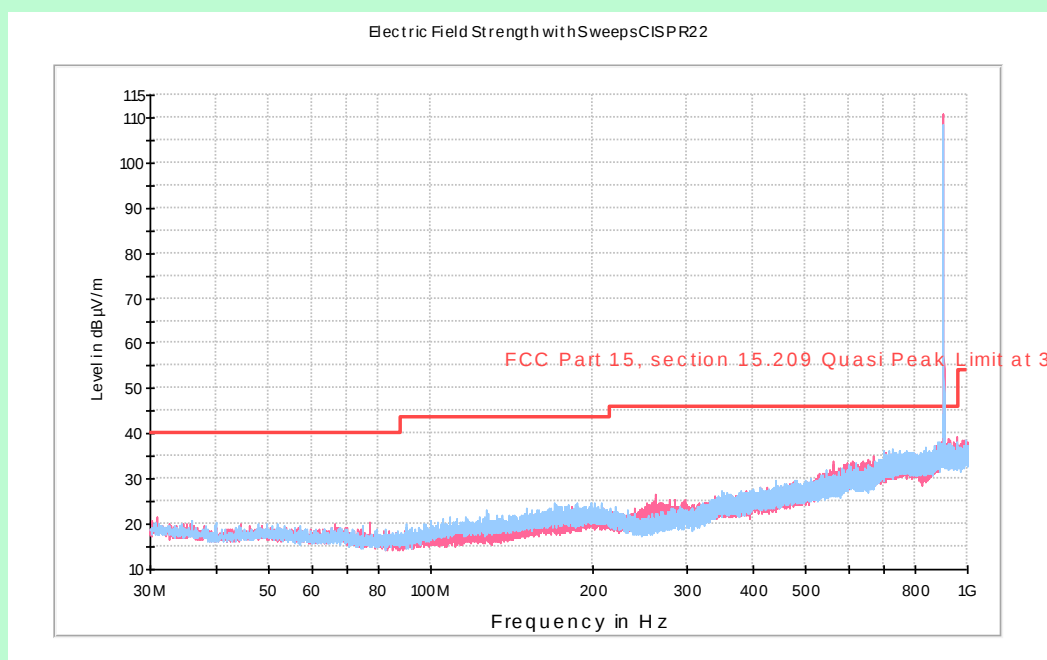
Channel 52 (926.45 MHz)

Note : Peak Graph - Perpendicular

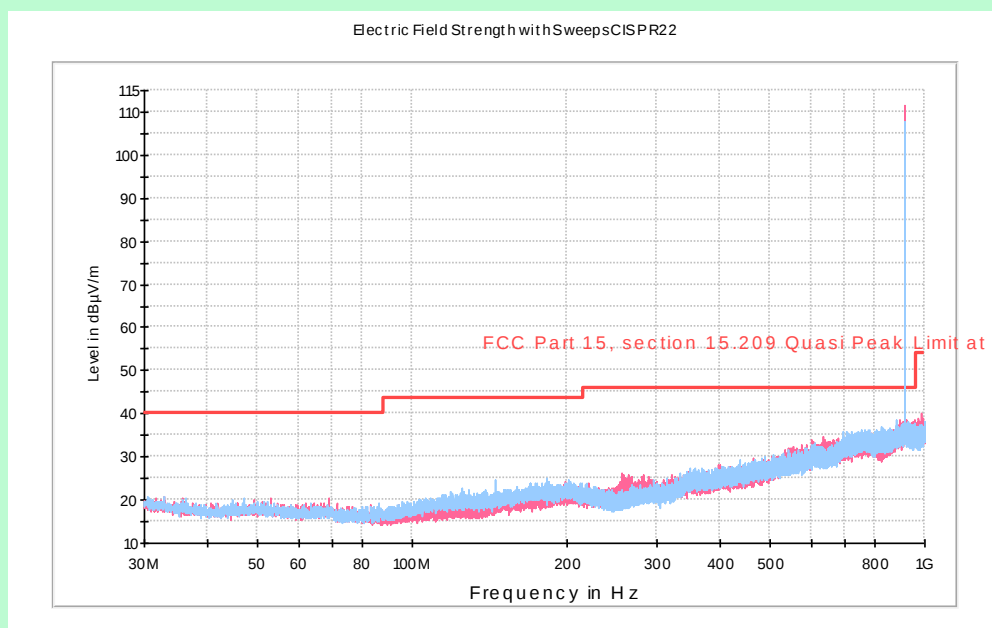
TEST RESULT – 9 KHz to 30 MHz

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 FOUND									PASS

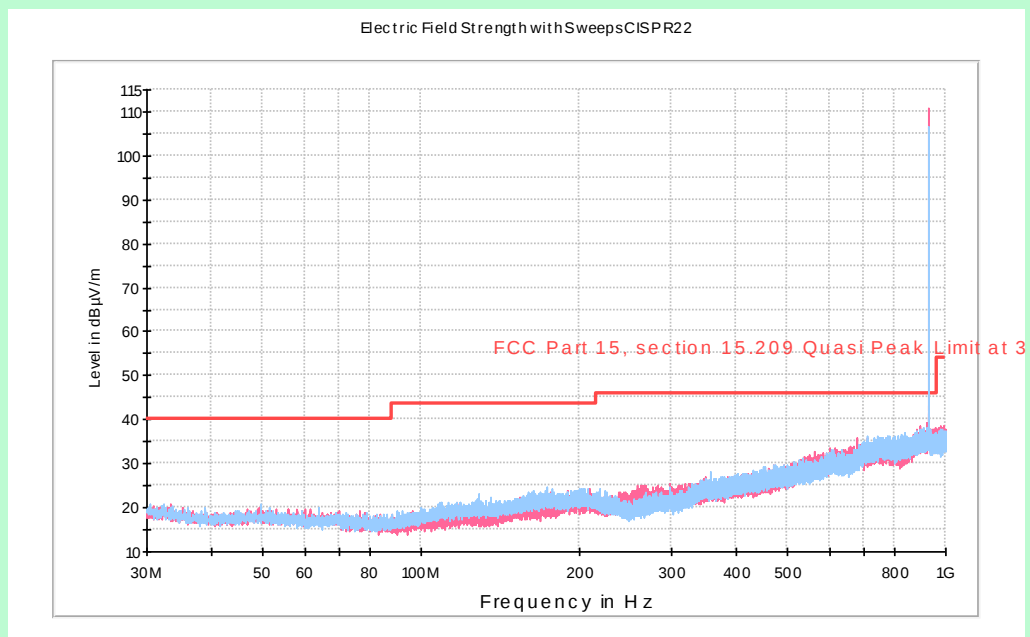
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)

TEST GRAPHS – 30 MHz to 1 GHz**Channel 1 (903.55 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 27 (916.35 M Hz)**

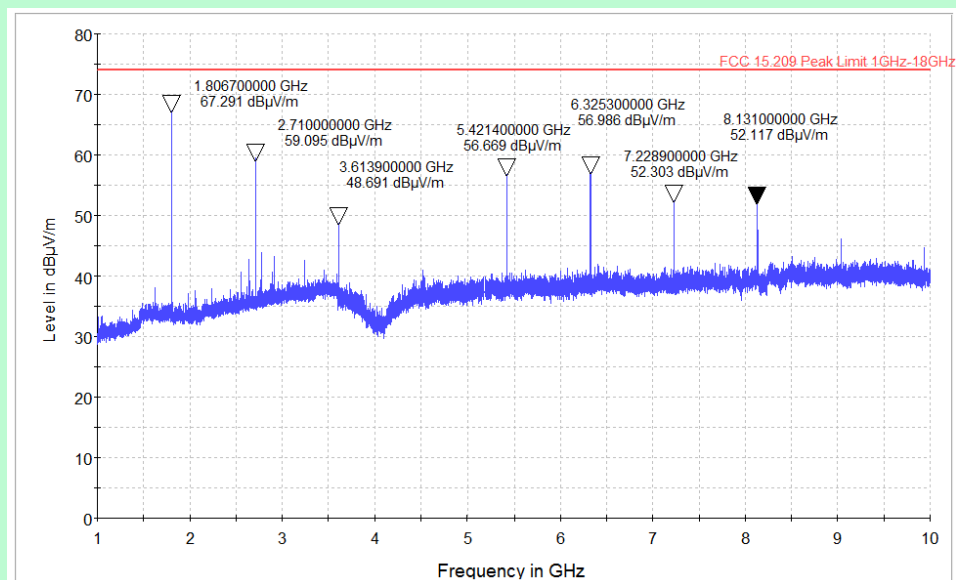
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 52 (926.45 M Hz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

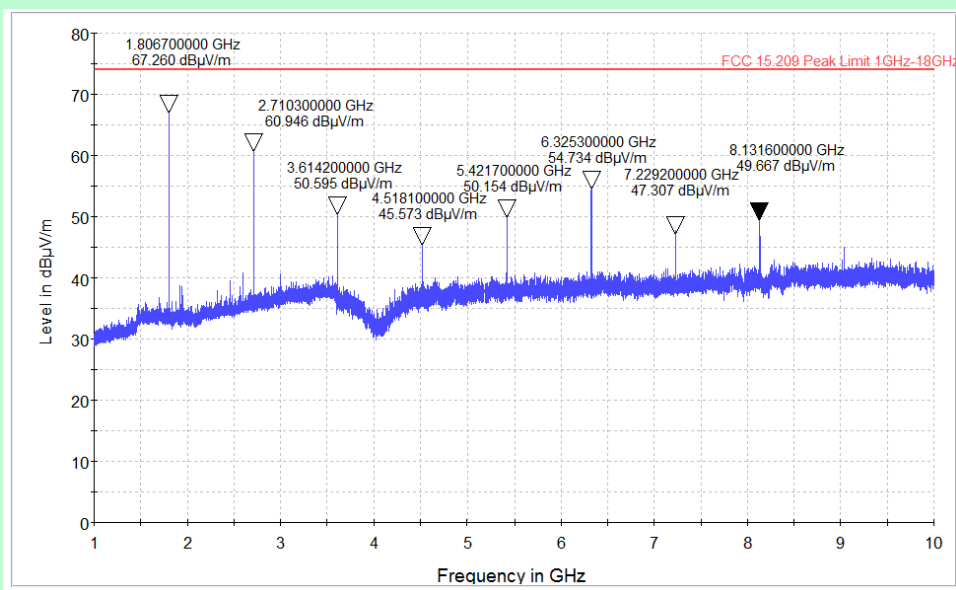
TEST RESULT – 30 MHz to 1 GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	cm	H / V	deg	dB	dBµV/m	
1	31.13	19.4	200	V	210	20.6	40	PASS
1	31.67	19.5	300	H	210	20.5	40	PASS
1	198.96	23.5	100	H	30	20	43.5	PASS
1	207.57	23.1	400	H	240	20.4	43.5	PASS
1	438.08	27.7	100	H	0	18.3	46	PASS
1	477.29	28.6	100	H	120	17.4	46	PASS
1	562.38	31.4	200	V	60	14.6	46	PASS
1	903.60	106.3	100	V	240	-48.3	46	INTENDED FREQUENCY
1	959.31	37.4	100	V	30	8.6	46	PASS
27	33.55	19.1	100	H	30	20.9	40	PASS
27	145.71	21	100	H	330	22.5	43.5	PASS
27	182.84	23.1	400	H	0	20.4	43.5	PASS
27	201.99	23.5	100	H	240	20	43.5	PASS
27	480.73	28.7	100	H	0	17.3	46	PASS
27	487.99	28.2	300	V	30	17.8	46	PASS
27	634.32	32.9	100	V	240	13.1	46	PASS
27	916.40	106.9	100	V	240	-48.9	46	INTENDED FREQUENCY
27	985.83	37.8	100	V	240	16.2	54	PASS
52	30.99	19.4	300	V	300	20.6	40	PASS
52	33.12	19.2	100	H	240	20.8	40	PASS
52	174.72	23.2	100	H	210	20.3	43.5	PASS
52	201.28	23.5	200	H	300	20	43.5	PASS
52	469.58	28.5	100	H	270	17.5	46	PASS
52	491.47	28.8	100	H	270	17.2	46	PASS
52	675.81	33.6	200	V	300	12.4	46	PASS
52	926.51	106.5	100	V	240	-48.5	46	INTENDED FREQUENCY
52	989.33	37.8	100	V	0	16.2	54	PASS
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

TEST GRAPHS – 1 GHz to 10 GHz



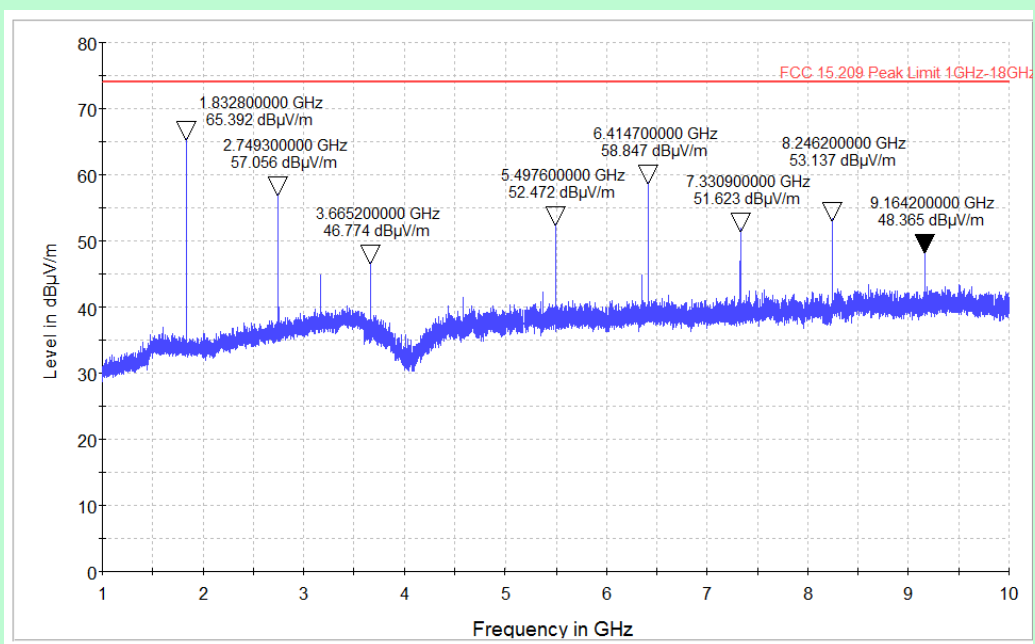
Channel 1 (903.55 MHz)

Note : Peak Graph - Horizontal



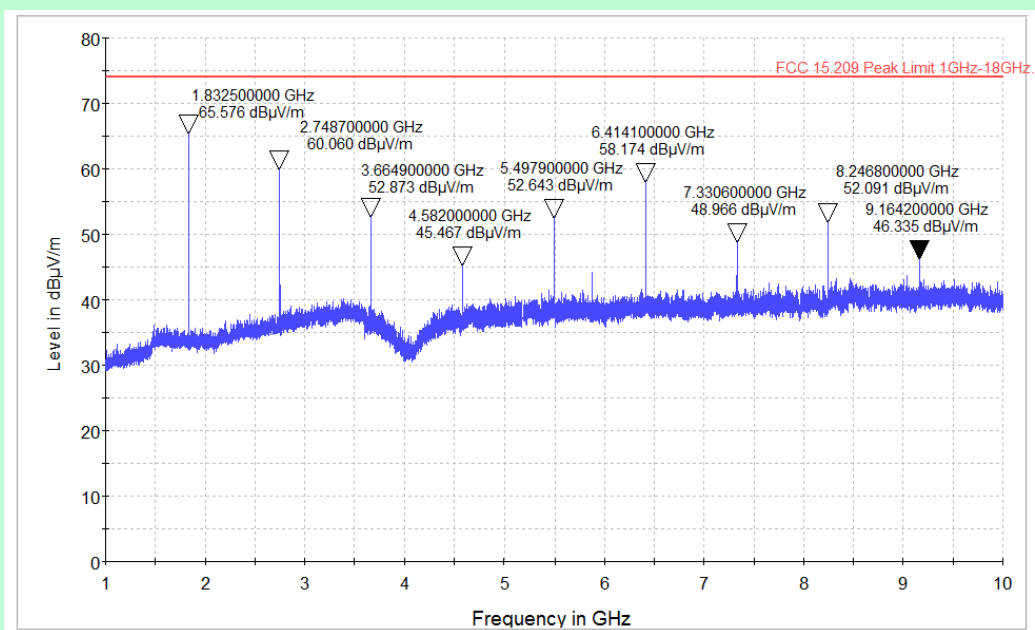
Channel 1 (903.55 MHz)

Note : Peak Graph - Vertical



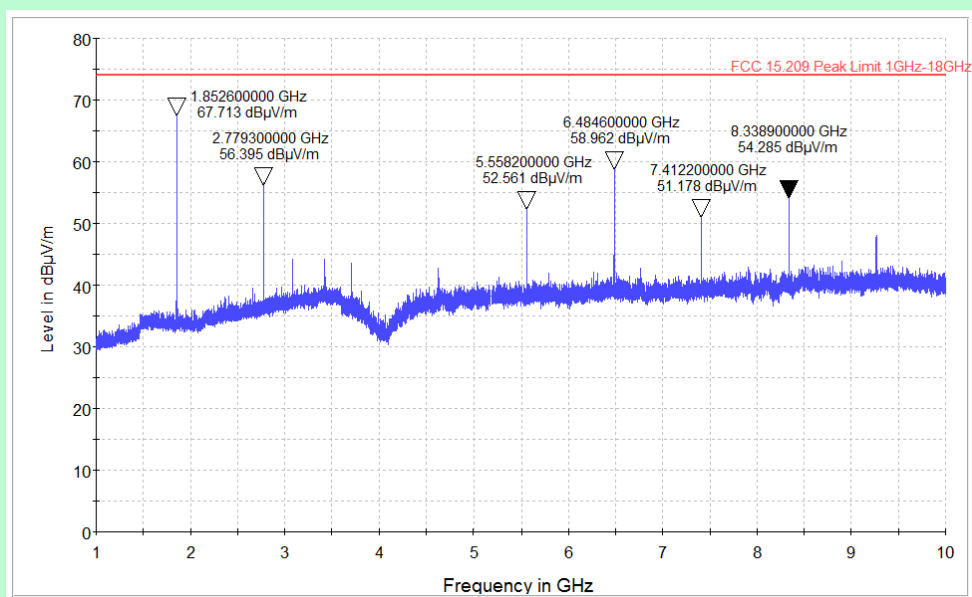
Channel 27 (916.35 MHz)

Note : Peak Graph - Horizontal



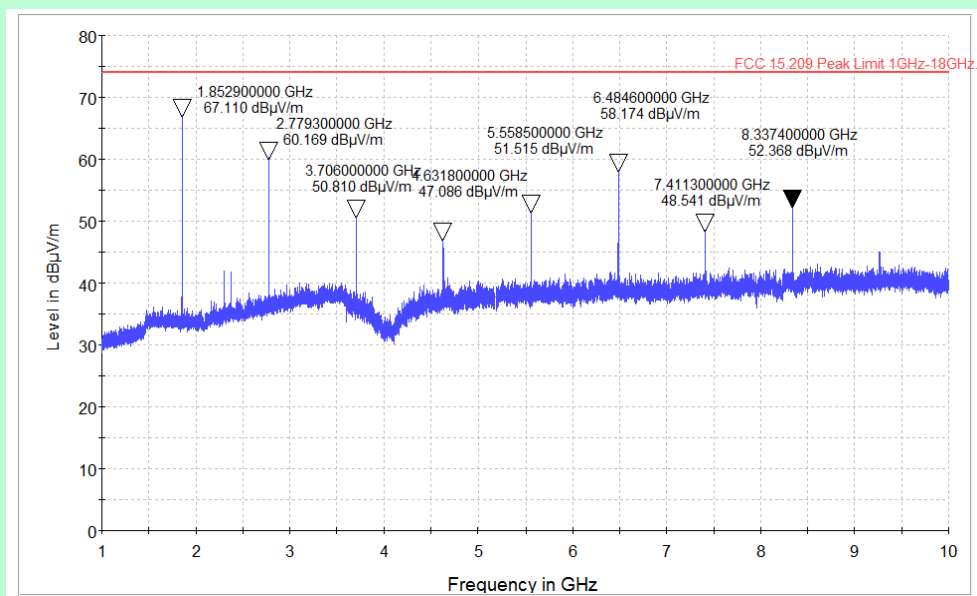
Channel 27 (916.35 MHz)

Note : Peak Graph - Vertical



Channel 52 (926.45 MHz)

Note : Peak Graph - Horizontal



Channel I 52 (926.45 MHz)

Note : Peak Graph - Vertical

TEST RESULT – 1 GHz to 10 GHz							RESTRICTED BAND – PEAK & AVERAGE			
Channel	Spurious Frequency	Spurious Peak Level	Height	Ant Pol	Peak Limit	Peak Margin	Calculated Average Reading [Peak – Duty cycle]	Average Limit	Margin	Results
#	GHz	dBµV/m	cm	H / V	dBµV/m	dB	dBµV/m	dBµV/m	dB	
1	2.71	59.095	100	H	74	14.9	41.0	54	13.0	PASS
1	3.6139	48.691	100	H	74	25.3	30.6	54	23.4	PASS
1	5.4214	56.669	100	H	74	17.3	38.6	54	15.4	PASS
1	6.3253	56.986	100	H	74	17.0	38.9	54	15.1	PASS
1	7.2289	52.303	100	H	74	21.7	34.2	54	19.8	PASS
1	8.131	52.117	100	H	74	21.9	34.0	54	20.0	PASS
1	2.7103	60.946	100	V	74	13.1	42.9	54	11.1	PASS
1	3.6142	50.595	100	V	74	23.4	32.5	54	21.5	PASS
1	4.5181	45.573	100	V	74	28.4	27.5	54	26.5	PASS
1	5.4217	50.154	100	V	74	23.8	32.1	54	21.9	PASS
1	6.3253	54.734	100	V	74	19.3	36.7	54	17.3	PASS
1	7.2292	47.307	100	V	74	26.7	29.2	54	24.8	PASS
1	8.1316	49.667	100	V	74	24.3	31.6	54	22.4	PASS
27	2.7493	57.056	100	H	74	16.9	39.0	54	15.0	PASS
27	3.6652	46.774	100	H	74	27.2	28.7	54	25.3	PASS
27	5.4976	52.472	100	H	74	21.5	34.4	54	19.6	PASS
27	6.4141	58.847	100	H	74	15.2	40.8	54	13.2	PASS
27	7.3309	51.623	100	H	74	22.4	33.5	54	20.5	PASS
27	8.2462	53.137	100	H	74	20.9	35.1	54	18.9	PASS
27	9.1642	48.365	100	H	74	25.6	30.3	54	23.7	PASS
27	2.7487	60.06	100	V	74	13.9	42.0	54	12.0	PASS
27	3.6649	52.873	100	V	74	21.1	34.8	54	19.2	PASS
27	4.582	45.467	100	V	74	28.5	27.4	54	26.6	PASS
27	5.4979	52.643	100	V	74	21.4	34.6	54	19.4	PASS
27	6.4141	58.174	100	V	74	15.8	40.1	54	13.9	PASS
27	7.3063	48.966	100	V	74	25.0	30.9	54	23.1	PASS
27	8.2468	52.091	100	V	74	21.9	34.0	54	20.0	PASS
27	9.1642	46.335	100	V	74	27.7	28.3	54	25.7	PASS
52	2.7493	57.056	100	H	74	16.9	39.0	54	15.0	PASS
52	3.6652	46.774	100	H	74	27.2	28.7	54	25.3	PASS
52	5.4976	52.472	100	H	74	21.5	34.4	54	19.6	PASS
52	6.4141	58.847	100	H	75	16.2	40.8	55	14.2	PASS
52	7.3309	51.623	100	H	76	24.4	33.5	56	22.5	PASS
52	8.2462	53.137	100	H	74	20.9	35.1	54	18.9	PASS
52	9.1642	48.365	100	H	74	25.6	30.3	54	23.7	PASS
52	1.8325	65.576	100	V	74	8.4	47.5	54	6.5	PASS
52	2.7487	60.06	100	V	74	13.9	42.0	54	12.0	PASS
52	3.6649	52.873	100	V	74	21.1	34.8	54	19.2	PASS
52	4.582	45.467	100	V	74	28.5	27.4	54	26.6	PASS
52	5.4979	52.643	100	V	74	21.4	34.6	54	19.4	PASS
52	6.4141	58.174	100	V	74	15.8	40.1	54	13.9	PASS
52	7.3063	48.966	100	V	74	25.0	30.9	54	23.1	PASS
52	8.2468	52.091	100	V	74	21.9	34.0	54	20.0	PASS
52	9.1642	46.335	100	V	74	27.7	28.3	54	25.7	PASS
52	8.3	56.8	100	V	74	17.2	38.7	54	15.3	PASS

Note :

Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss – Ext. Pre amplifier Gain (dB)

Duty Cycle Correction Factor is calculated using the guidelines provided in DA 00-705 (Spurious Radiated Emissions)

Duty Cycle correction Factor = $20 \log (1.560 \times 8 / 100) = -18.08 \text{ dB}$

Duty Cycle Factor = $20 \log (\text{Dwell time} / 100 \text{ msec})$, Number of Transmission for 100 msec: 8, Dwell time per Transmission: 1.560 msec

TEST RESULT – 1 GHz to 10 GHz**NON-RESTRICTED BAND - PEAK**

Channel	Measured Fundamental	Spurious Emission	Measured Harmonic	Height	Ant Pol	Limit	Margin	Results
						[Fundamental – 20 dBc]		
#	dBuV/m	GHz	dBuV/m	cm	H / V	dBuV/m	dB	
1	106.3	1.81	67.29	100	H	88.0	86.30	19.01
1	106.3	1.81	67.26	100	V	66.0	86.30	19.04
27	106.9	1.83	65.39	100	H	88.0	86.90	21.51
27	106.9	1.83	65.58	100	V	44.0	86.90	21.32
52	106.5	1.83	65.39	100	H	66.0	86.50	21.11
52	106.5	1.83	65.58	100	V	88.0	86.50	20.92

Note :

Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)

TEST SETUP PHOTOGRAPHS

Refer Annexure -1

Radiated Emission Test Setup

7 DTS CHANNELS

7.1 SPURIOUS RADIATED EMISSIONS

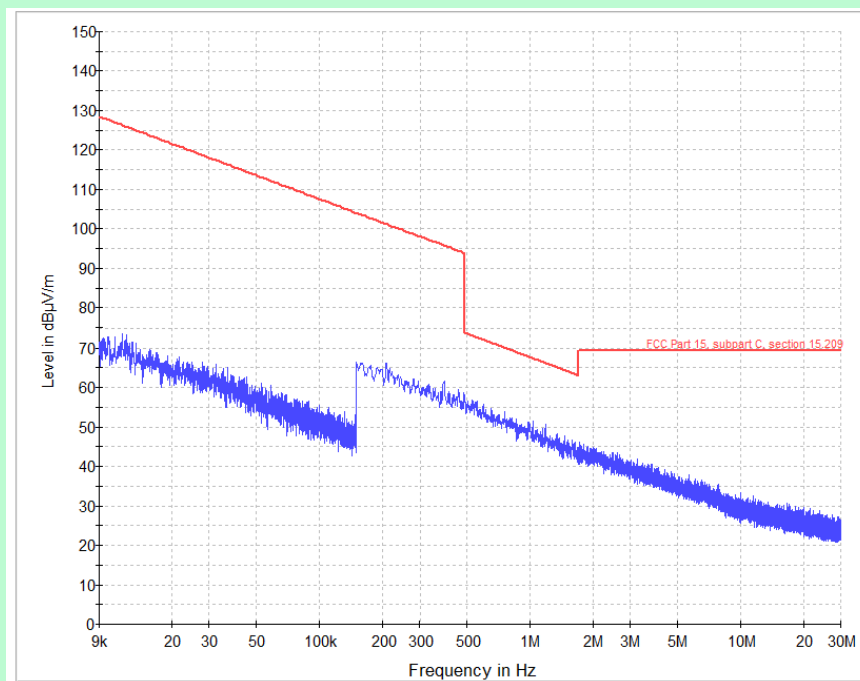
EUT Nomenclature	Wireless Smoke Detector	Test Report No.	EMC-0004-1
Model No.	FWD-200P	Serial No.	01
Test Start Date	22-Oct-2013	Temperature (°C)	24.1
Test End Date	14-Dec-2013	Humidity RH (%)	56.1
Tested By	Gulshan Kumar	Pressure (mbar)	NR
Input Voltage / Freq	3.3Vdc		
Operating Mode	Refer Page 5 Operating 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	04-Feb-2014
Y	3m Semi Anechoic Chamber	ETS Lindgren	DKE 6X7 DBL.DR	1625	31-Dec-2013
Y	Double Ridge Guide Horn Antenna	ETS Lindgren	3117	00064055	07-Nov-2013
Y	Bilog Antenna	ETS Lindgren	HLP3003C	130525	30-Nov-2013
Y	Loop Antenna	ETS Lindgren	6507	000103694	12-Mar-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1A	09-May-2014
Y	RF cable (9KHz to 1GHz)	COLEMAN	RG214	RE-1B	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2A	09-May-2014
Y	RF cable (1GHz to 18GHz)	AH Systems	SAC-18G-06	RE-2B	09-May-2014
Y	Signal Conditioning unit	R&S	SCU-18	10178	13-June-2014
Y	High Pass Filter	Wainwright	WHKX1.5/15G-12ST	1	09-May-2014
Y	EMC32 Software	R&S	8.30.0	820-OT101248	NA

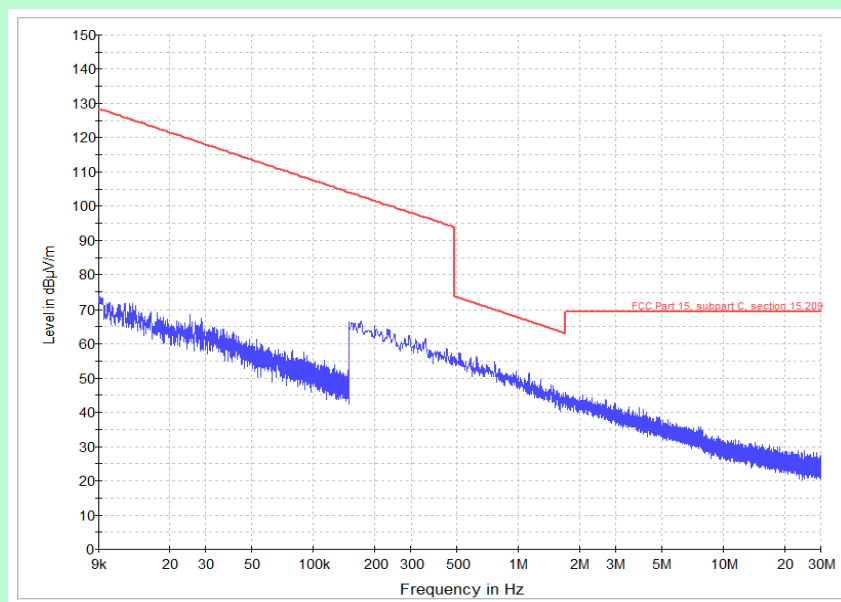
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

TEST GRAPHS – 9 KHz to 30 MHz



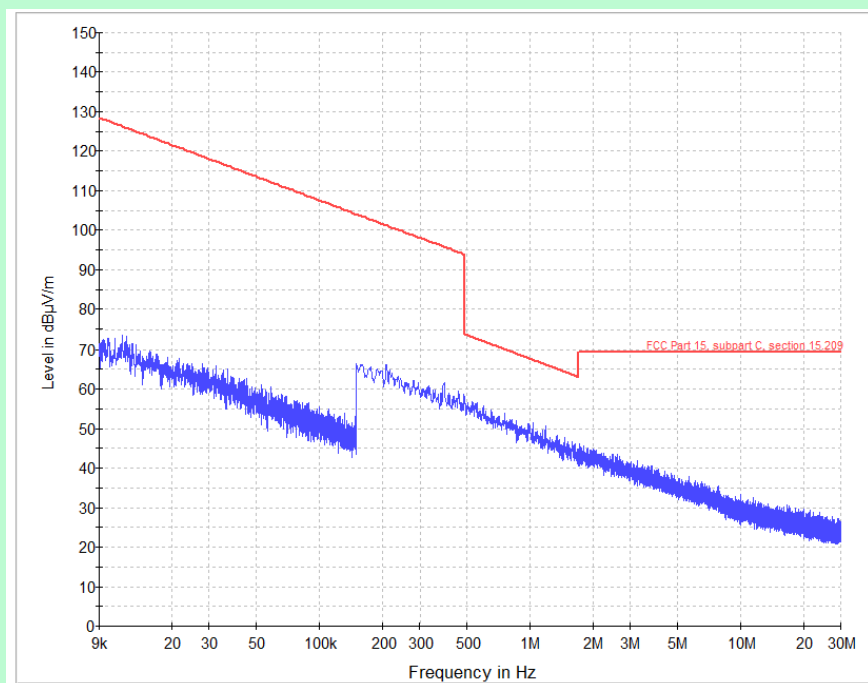
Channel 1 (902.875 MHz)

Note : Peak Graph - Parallel

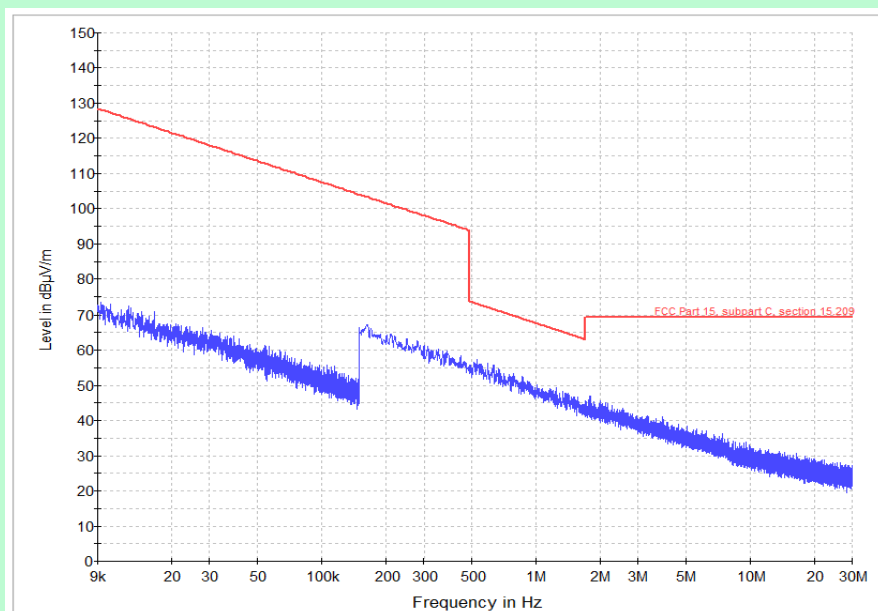


Channel 1 (902.875 MHz)

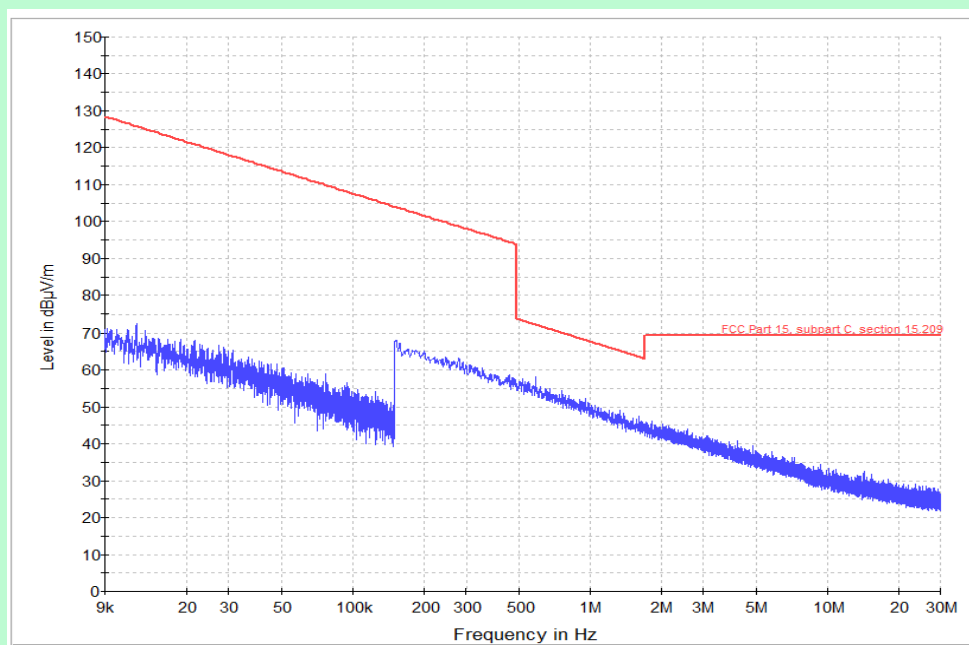
Note : Peak Graph - Perpendicular

**Channel 2 (908.425 MHz)**

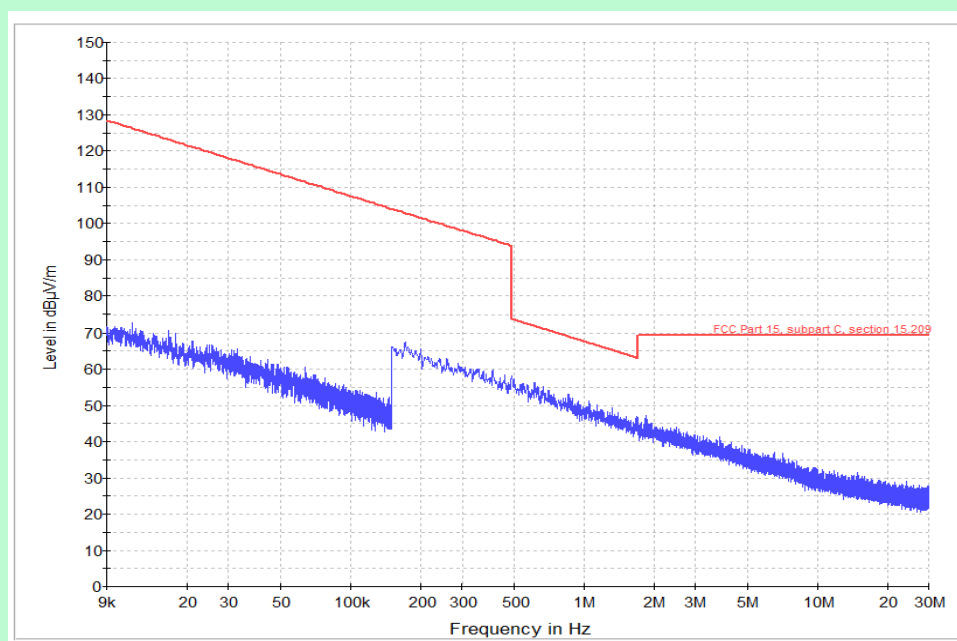
Note : Peak Graph - Parallel

**Channel 2 (908.425 MHz)**

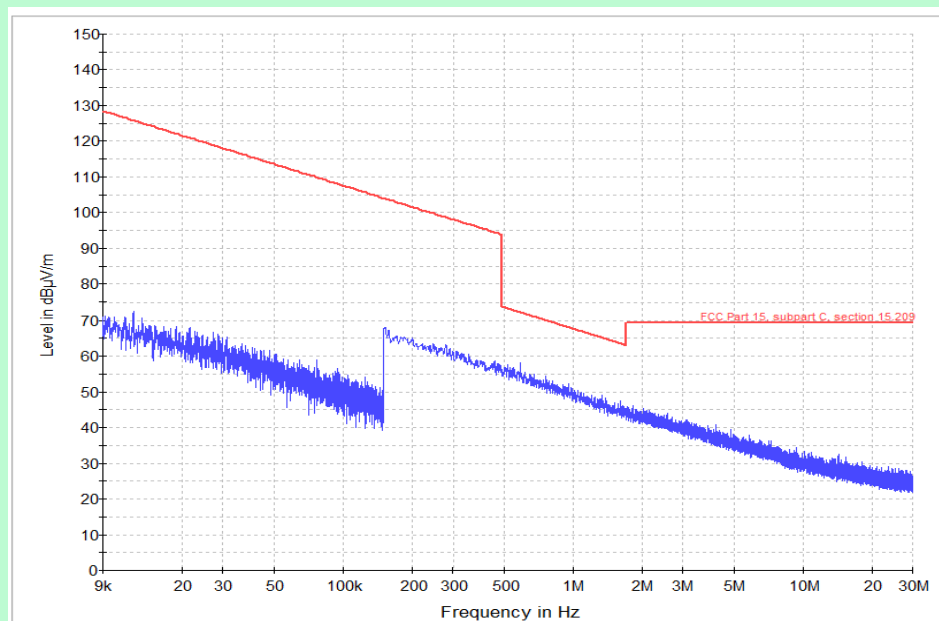
Note : Peak Graph - Perpendicular

**Channel 3 (914.325 MHz)**

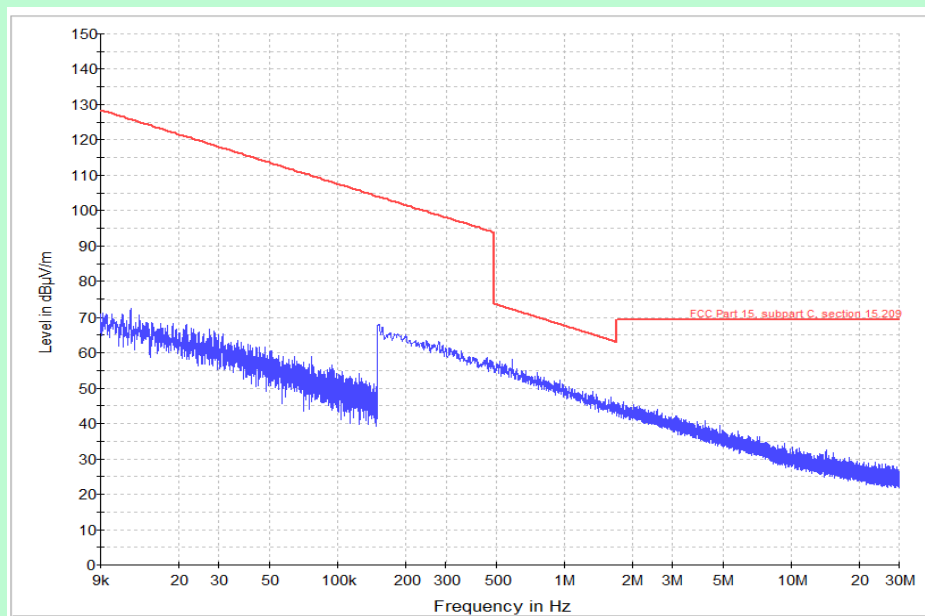
Note : Peak Graph - Parallel

**Channel 3 (914.235 MHz)**

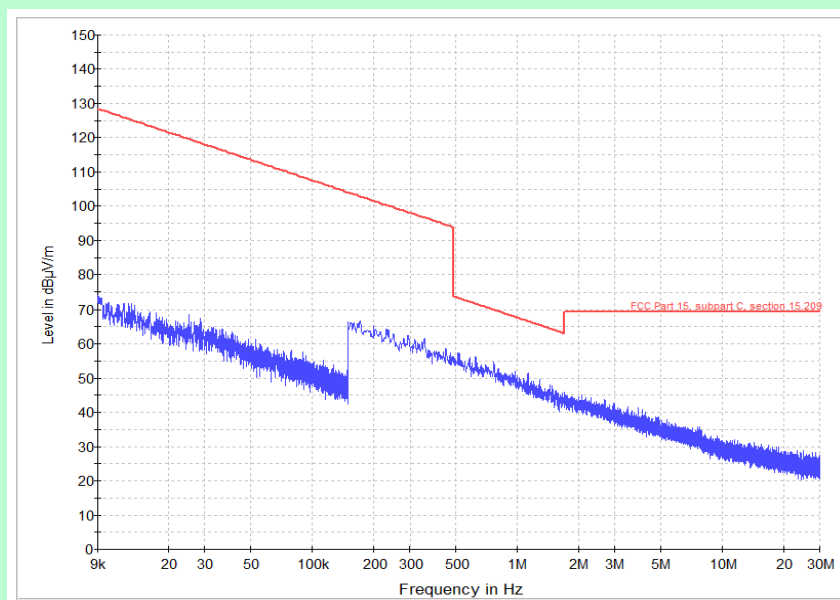
Note : Peak Graph - Perpendicular

**Channel 4 (915.325 MHz)**

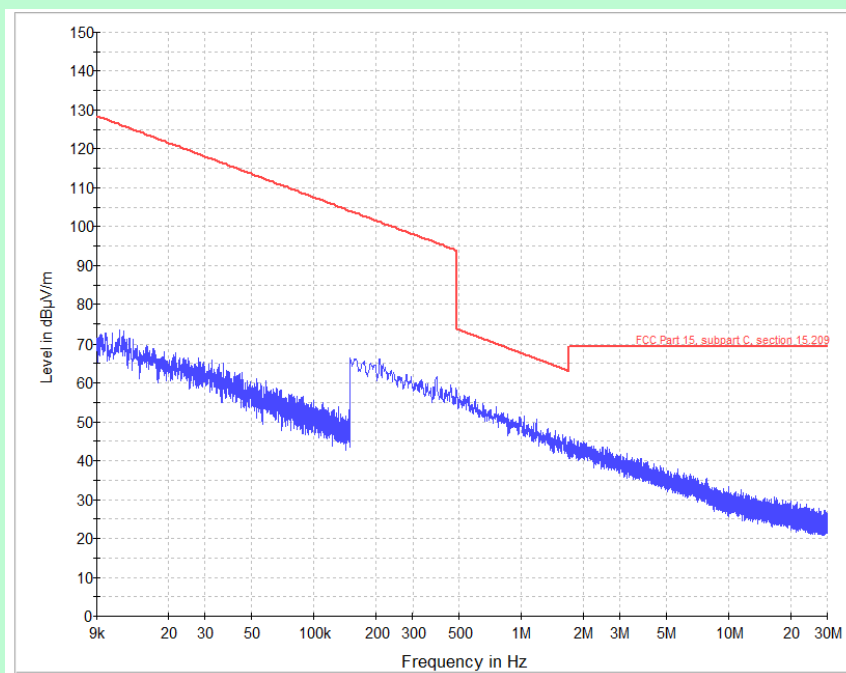
Note : Peak Graph - Parallel

**Channel 4 (915.325 MHz)**

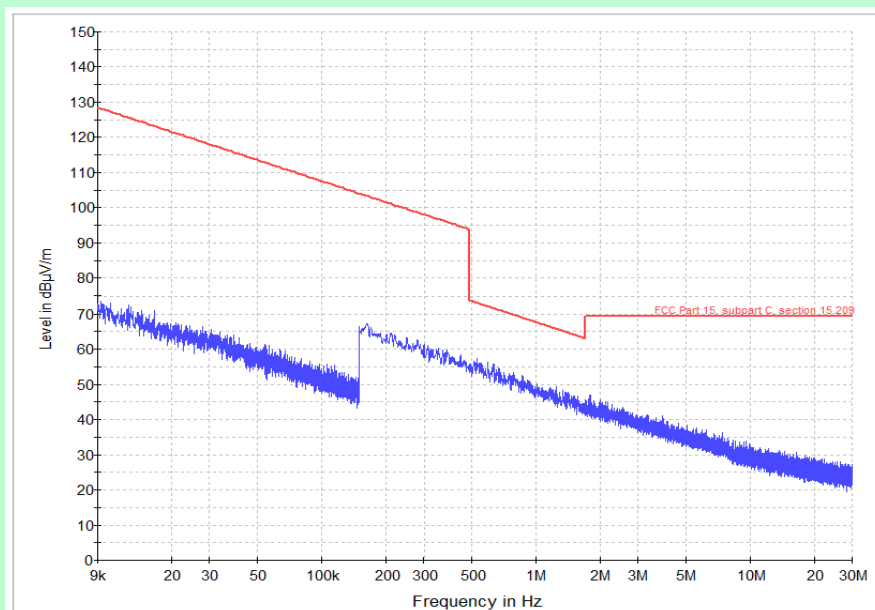
Note : Peak Graph - Perpendicular

**Channel 5 (921.575 MHz)**

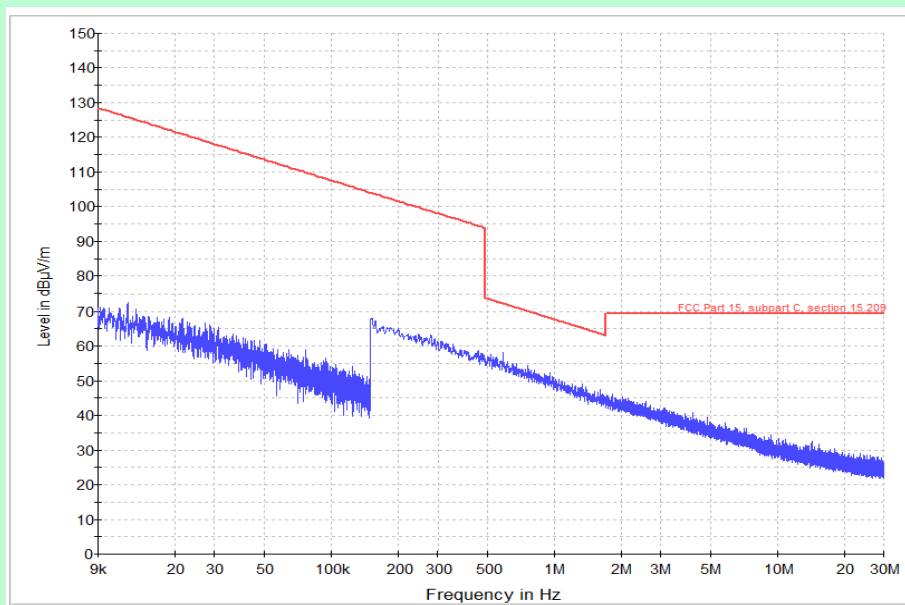
Note : Peak Graph - Perpendicular

**Channel 5 (921.575 MHz)**

Note : Peak Graph - Parallel

**Channel 6 (927.125 MHz)**

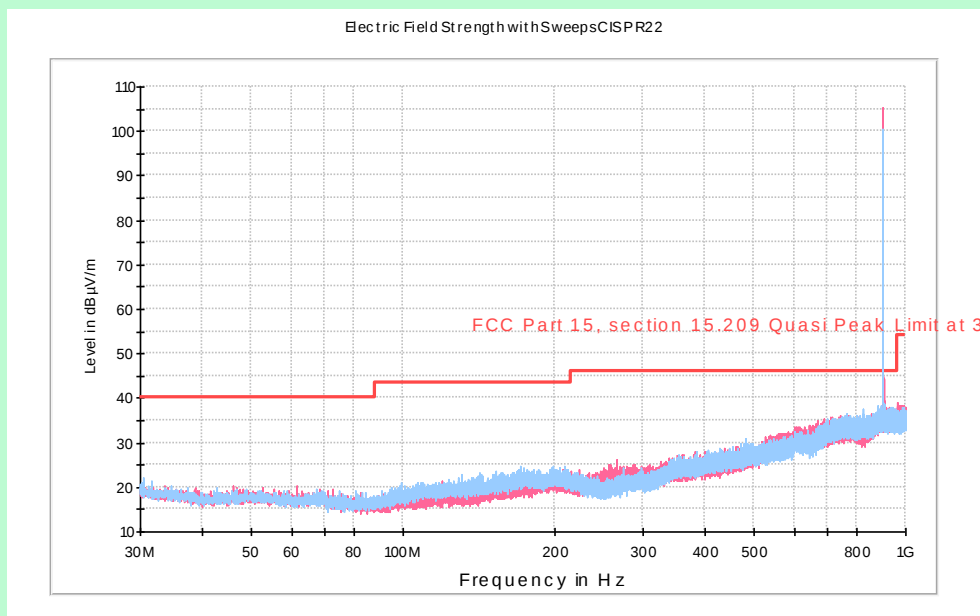
Note : Peak Graph - Perpendicular

**Channel 6 (927.125 MHz)**

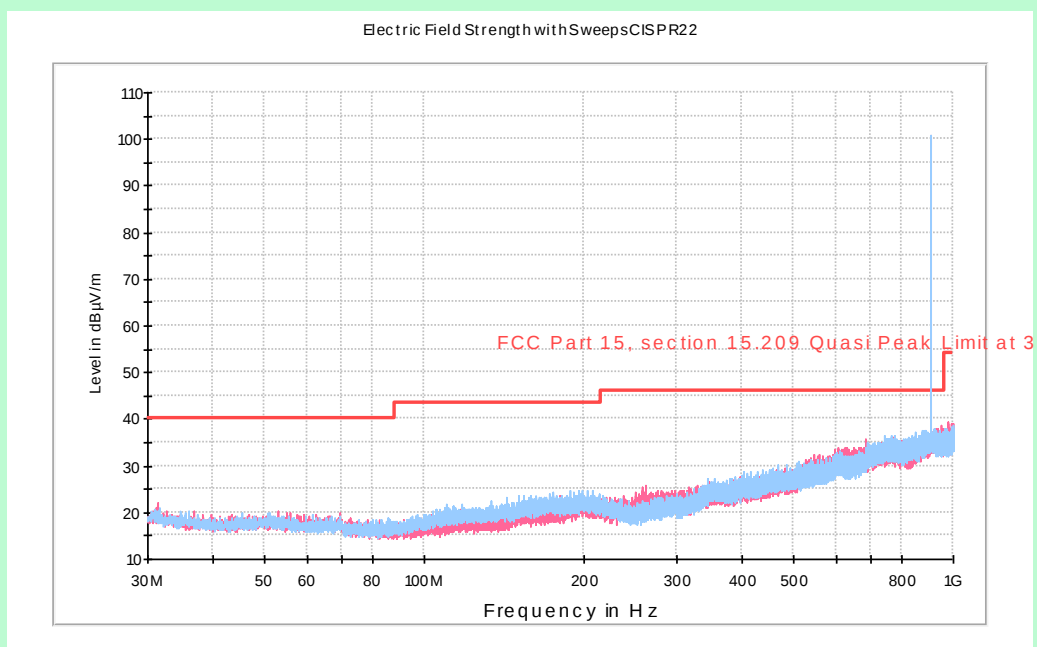
Note : Peak Graph - Parallel

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 FOUND									PASS
Note : Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)									

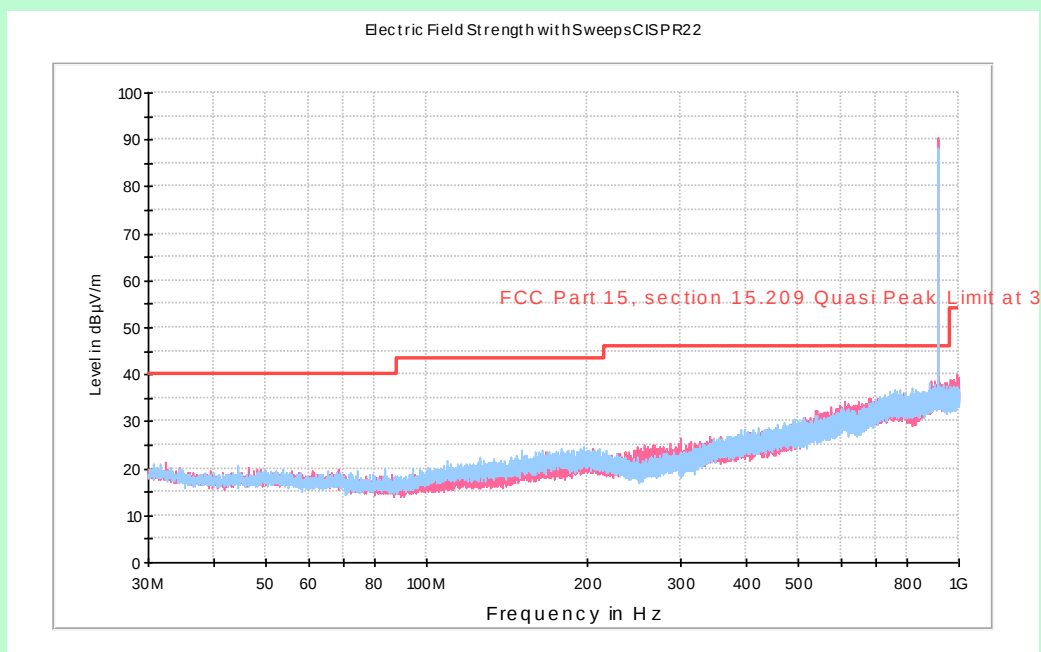
TEST GRAPHS – 30 MHz to 1 GHz

**Channel 1 (902.875 MHz)**

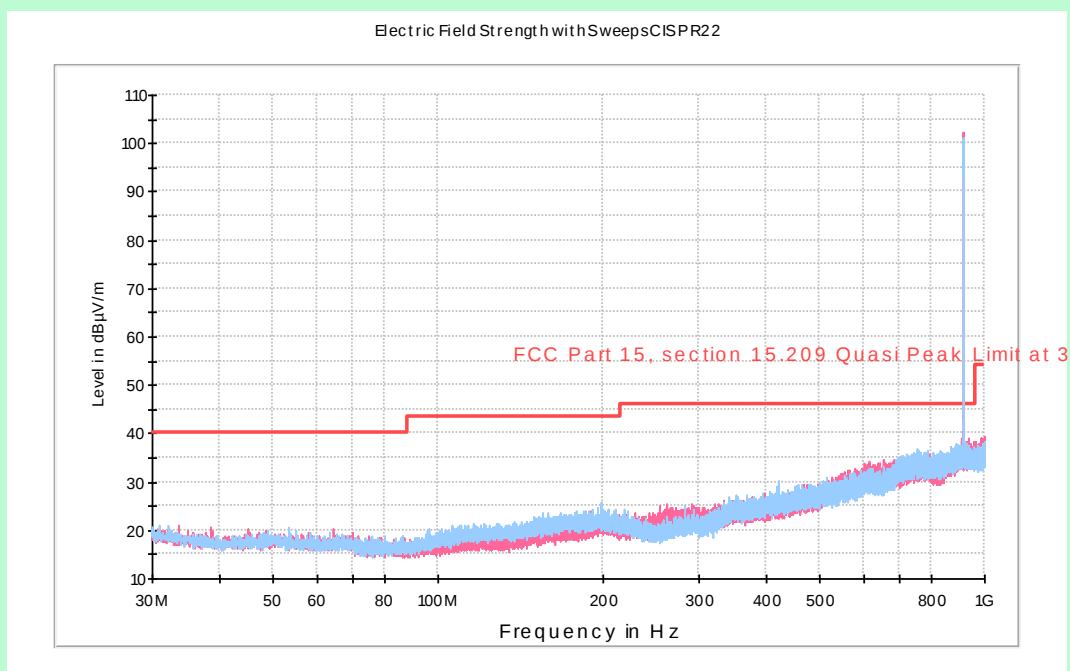
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 2 (908.425 MHz)**

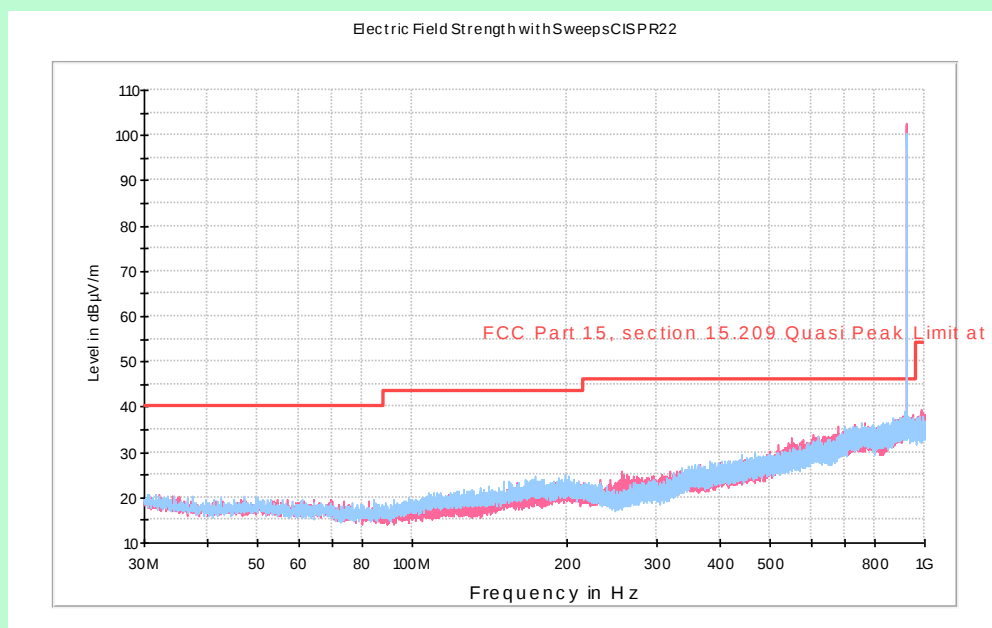
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 3 (914.325 MHz)**

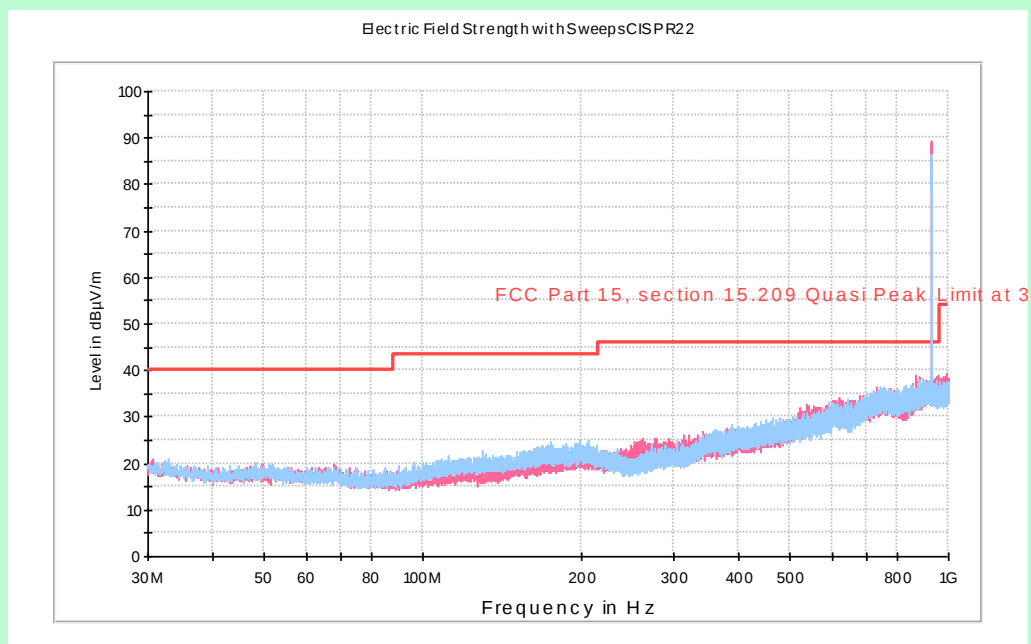
Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 4 (915.325 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

**Channel 5 (921.575 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

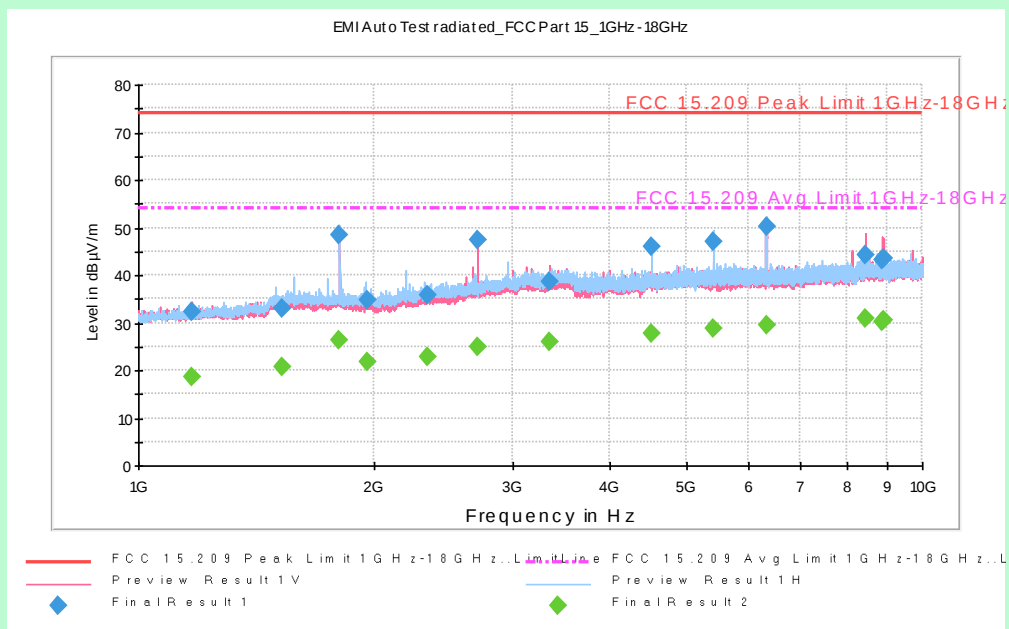
**Channel 6 (927.125 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

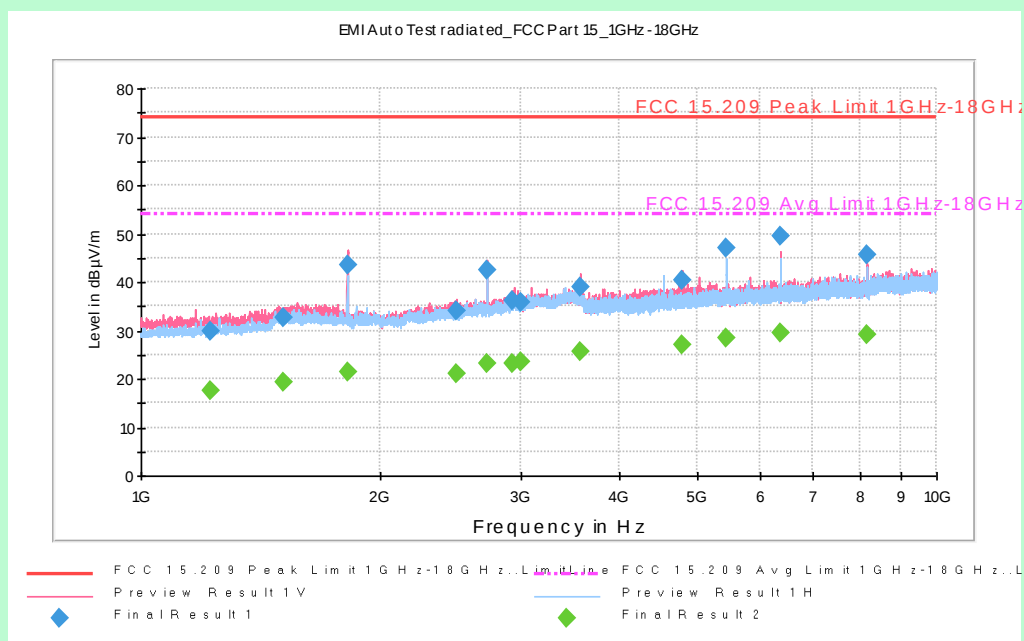
TEST RESULT – 30 MHz to 1 GHz								
Channel	Measured Spurious	Quasi Peak	Height	Ant Pol	Azimuth	Margin	Limit @ 3m Distance	Results
#	MHz	dBµV/m	cm	H / V	deg	dB	dBµV/m	
1	30.64	19.7	100.0	H	240.0	20.3	40	PASS
1	30.89	19.5	100.0	V	180.0	20.5	40	PASS
1	118.59	20.3	100.0	H	240.0	23.2	44	PASS
1	170.66	23.2	100.0	H	210.0	20.3	44	PASS
1	199.72	23.5	100.0	H	210.0	20.0	44	PASS
1	267.07	23.5	100.0	V	330.0	22.5	46	PASS
1	469.75	28.6	100.0	H	180.0	17.4	46	PASS
1	480.91	28.7	100.0	H	150.0	17.3	46	PASS
1	902.72	103.2	100.0	V	240.0	-45.2	46	INTENDED FREQUENCY
2	30.36	19.8	100.0	H	180.0	20.2	40	PASS
2	31.99	19.3	100.0	V	60.0	20.7	40	PASS
2	198.53	23.6	100.0	H	270.0	19.9	44	PASS
2	202.52	23.4	100.0	H	210.0	20.1	44	PASS
2	263.81	23.5	100.0	V	270.0	22.5	46	PASS
2	468.54	28.6	100.0	H	330.0	17.4	46	PASS
2	484.62	28.8	100.0	H	0.0	17.2	46	PASS
2	908.28	100.6	100.0	H	0.0	-42.6	46	INTENDED FREQUENCY
2	977.21	36.6	100.0	H	330.0	17.4	54	PASS
3	31.99	19.5	100.0	H	30.0	20.5	40	PASS
3	32.47	19.4	100.0	H	300.0	20.6	40	PASS
3	194.48	23.3	100.0	H	240.0	20.2	44	PASS
3	197.22	23.5	300.0	H	150.0	20.0	44	PASS
3	489.03	28.3	100.0	V	0.0	17.7	46	PASS
3	492.11	28.9	400.0	H	240.0	17.1	46	PASS
3	885.12	36.6	100.0	V	0.0	9.4	46	PASS
3	914.17	89.7	100.0	V	90.0	-31.7	46	INTENDED FREQUENCY
3	989.21	37.9	100.0	V	270.0	16.1	54	PASS
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

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	
4	31.09	19.4	100.0	V	120.0	20.6	40	PASS
4	32.81	19.2	100.0	V	60.0	20.8	40	PASS
4	115.5	20.2	100.0	H	90.0	23.3	44	PASS
4	122.11	20.4	100.0	H	150.0	23.1	44	PASS
4	197.94	23.5	100.0	H	90.0	20.0	44	PASS
4	198.19	23.5	100.0	H	180.0	20.0	44	PASS
4	421.11	26.7	100.0	V	180.0	19.3	46	PASS
4	476.42	28.7	100.0	H	240.0	17.3	46	PASS
4	915.17	100.8	100.0	V	90.0	-42.8	46	INTENDED FREQUENCY
5	30.96	19.7	100.0	H	270.0	20.3	40	PASS
5	199.24	23.6	100.0	H	30.0	19.9	44	PASS
5	200.45	23.6	100.0	H	90.0	19.9	44	PASS
5	465.95	28.5	100.0	H	60.0	17.5	46	PASS
5	492.56	28.9	100.0	H	180.0	17.1	46	PASS
5	547.43	31.2	100.0	V	60.0	14.8	46	PASS
5	676.94	33.7	100.0	V	30.0	12.3	46	PASS
5	921.43	101.8	100.0	V	90.0	-43.8	46	INTENDED FREQUENCY
5	985.02	37.8	100.0	V	210.0	16.2	54	PASS
6	30.99	19.7	300.0	H	0.0	20.3	40	PASS
6	32.34	19.5	100.0	H	270.0	20.5	40	PASS
6	198.37	23.5	400.0	H	0.0	20.0	44	PASS
6	206.44	23.3	100.0	H	330.0	20.2	44	PASS
6	461.58	28.4	100.0	H	60.0	17.6	46	PASS
6	477.69	28.7	100.0	H	150.0	17.3	46	PASS
6	867.33	36.2	200.0	H	120.0	9.8	46	PASS
6	926.97	88.1	100.0	V	240.0	-30.0	46	INTENDED FREQUENCY
6	995.69	38.0	100.0	V	240.0	16.0	54	PASS
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)								

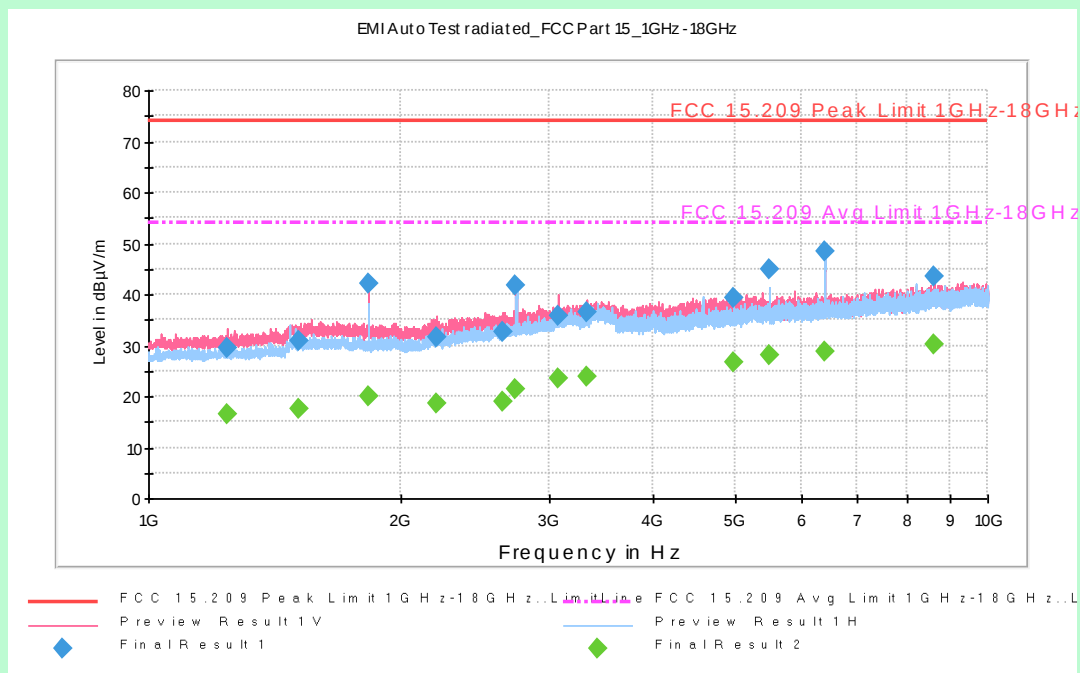
TEST GRAPHS – 1 GHz to 10 GHz



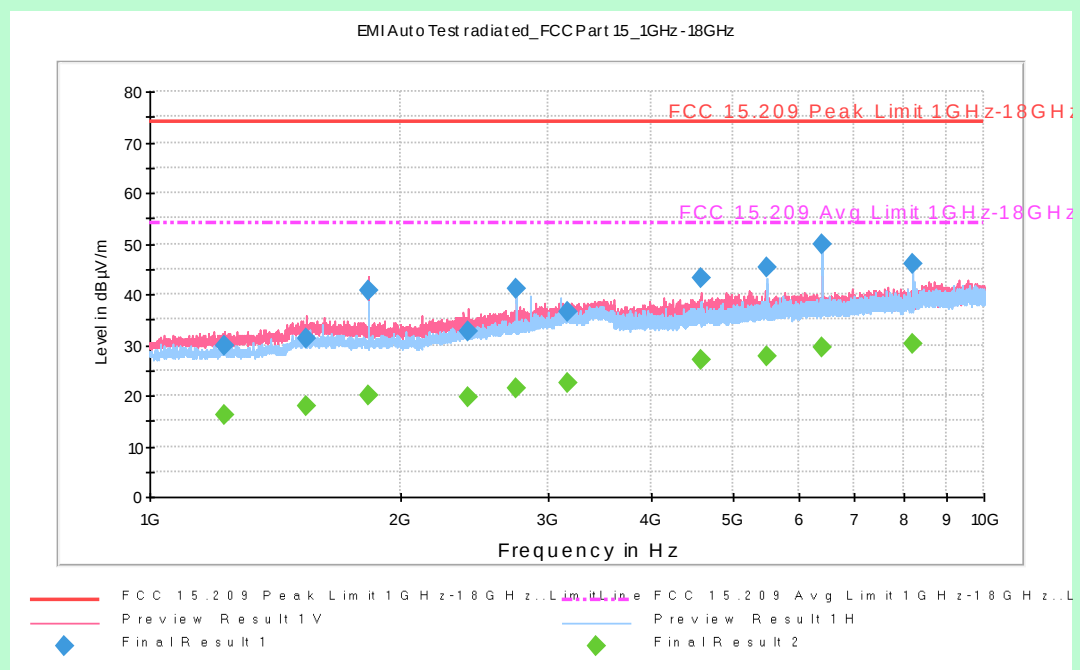
Channel 1 (902.875 MHz)



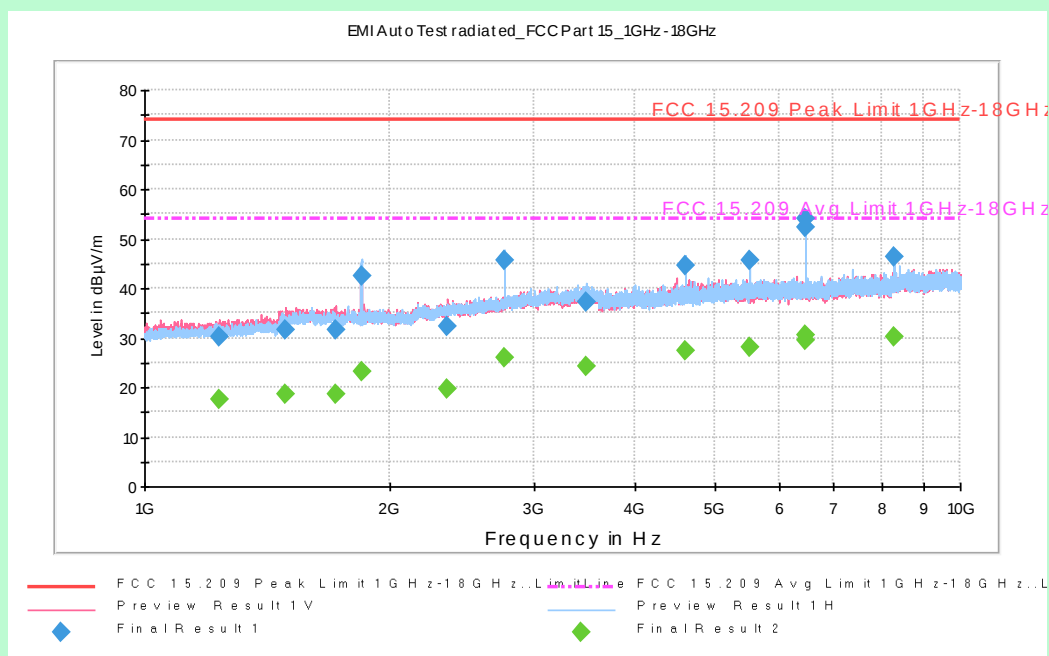
Channel 2 (908.425 MHz)



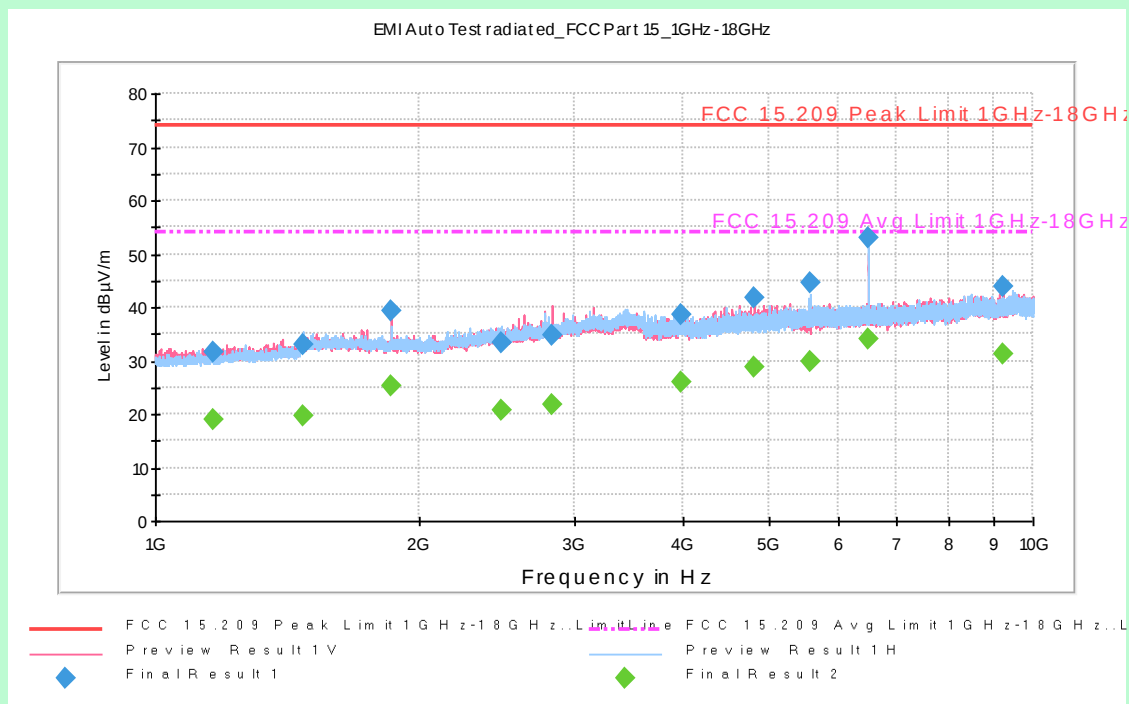
Channel 3 (914.325 MHz)



Channel 4 (915.325 MHz)



Channel 5 (921.575 MHz)



Channel 6 (927.575 MHz)

TEST RESULT – 1 GHz to 10 GHz					RESTRICTED BAND – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H /V	(deg)	(dB)	(dBμV/m)
1	1170.1	32.3	100.0	V	0.0	41.7	74.0
1	1527.9	33.1	400.0	V	22.0	40.9	74.0
1	1806.0	48.3	100.0	V	0.0	25.7	74.0
1	1963.0	34.9	400.0	V	22.0	39.1	74.0
1	2335.2	35.9	400.0	V	22.0	38.1	74.0
1	2707.8	47.3	100.0	V	0.0	26.7	74.0
1	3349.9	38.5	400.0	H	44.0	35.5	74.0
1	4513.2	45.9	200.0	H	308.0	28.1	74.0
1	5418.6	47.0	200.0	H	308.0	27.0	74.0
1	6322.2	50.2	200.0	H	22.0	23.8	74.0
1	8443.5	44.2	400.0	V	110.0	29.8	74.0
1	8871.0	43.1	400.0	V	0.0	30.9	74.0
1	8926.8	43.5	400.0	H	0.0	30.5	74.0
2	1220.5	29.8	400.0	V	22.0	44.2	74.0
2	1513.9	32.6	400.0	V	22.0	41.4	74.0
2	1816.3	43.6	100.0	V	22.0	30.4	74.0
2	2490.4	33.9	400.0	V	22.0	40.1	74.0
2	2724.4	42.5	300.0	H	44.0	31.5	74.0
2	2931.0	36.2	400.0	V	22.0	37.8	74.0
2	3007.0	35.7	400.0	H	22.0	38.3	74.0
2	3570.9	39.1	400.0	H	22.0	34.9	74.0
2	4796.7	40.5	400.0	V	66.0	33.5	74.0
2	5450.5	46.9	200.0	H	330.0	27.1	74.0
2	6360.9	49.5	100.0	H	44.0	24.5	74.0
2	8175.7	45.7	200.0	V	0.0	28.3	74.0
3	1240.8	29.5	400.0	V	22.0	44.5	74.0
3	1509.9	30.8	400.0	V	22.0	43.2	74.0
3	1828.0	42.1	100.0	V	0.0	31.9	74.0
3	2206.9	31.5	400.0	V	22.0	42.5	74.0
3	2639.4	32.5	200.0	H	0.0	41.5	74.0
3	2742.0	41.8	100.0	V	0.0	32.2	74.0
3	3074.5	35.9	400.0	V	110.0	38.1	74.0
3	3328.8	36.4	400.0	H	66.0	37.6	74.0
3	4990.2	39.3	400.0	V	0.0	34.7	74.0
3	5487.9	44.9	200.0	H	330.0	29.1	74.0
3	6402.3	48.4	200.0	V	0.0	25.6	74.0
3	8645.5	43.6	300.0	H	220.0	30.4	74.0
Note : 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 – PEAK		
Channel	Frequency	MaxPeak	Height	Ant Pol	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
4	1229.5	29.8	400.0	V	22.0	44.2	74.0
4	1540.5	31.1	400.0	V	66.0	42.9	74.0
4	1830.3	40.6	100.0	V	0.0	33.4	74.0
4	2411.2	32.5	400.0	H	44.0	41.5	74.0
4	2745.1	41.0	100.0	V	0.0	33.0	74.0
4	3168.6	36.5	100.0	H	0.0	37.5	74.0
4	4578.4	43.0	200.0	H	286.0	31.0	74.0
4	5491.9	45.4	200.0	H	264.0	28.6	74.0
4	6405.4	50.0	200.0	H	22.0	24.0	74.0
4	8236.0	45.9	100.0	H	286.0	28.1	74.0
4	1236.3	30.1	400.0	V	66.0	43.9	74.0
4	1489.6	31.7	100.0	H	0.0	42.3	74.0
5	1719.6	31.7	100.0	H	0.0	42.3	74.0
5	1842.9	42.6	300.0	H	0.0	31.4	74.0
5	2355.4	32.4	100.0	H	0.0	41.6	74.0
5	2765.4	45.5	200.0	H	22.0	28.5	74.0
5	3484.5	37.1	100.0	H	0.0	36.9	74.0
5	4609.0	44.6	200.0	H	330.0	29.4	74.0
5	5531.1	45.8	200.0	H	286.0	28.2	74.0
5	6449.1	54.1	100.0	H	44.0	19.9	74.0
5	6453.6	52.3	100.0	H	22.0	21.7	74.0
5	8291.4	46.4	100.0	V	0.0	27.6	74.0
6	1166.5	31.7	400.0	V	154.0	42.3	74.0
6	1475.2	33.1	200.0	H	132.0	41.0	74.0
6	1854.6	39.3	100.0	V	0.0	34.7	74.0
6	2481.0	33.3	200.0	H	132.0	40.7	74.0
6	2825.2	34.7	200.0	H	132.0	39.3	74.0
6	3971.8	38.6	400.0	H	132.0	35.4	74.0
6	4816.5	41.8	400.0	V	286.0	32.2	74.0
6	5564.4	44.7	100.0	H	308.0	29.3	74.0
6	6492.3	53.1	100.0	H	44.0	20.9	74.0
6	9223.3	43.9	400.0	V	198.0	30.1	74.0
Note : 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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H / V	(deg)	(dB)	(dBμV/m)
1	1170.1	18.8	100.0	V	0.0	35.2	54.0
1	1527.9	20.7	400.0	V	22.0	33.3	54.0
1	1806.0	26.2	100.0	V	0.0	27.8	54.0
1	1963.0	21.7	400.0	V	22.0	32.3	54.0
1	2335.2	22.9	400.0	V	22.0	31.1	54.0
1	2707.8	25.1	100.0	V	0.0	28.9	54.0
1	3349.9	26.0	400.0	H	44.0	28.0	54.0
1	4513.2	27.6	200.0	H	308.0	26.4	54.0
1	5418.6	28.8	200.0	H	308.0	25.2	54.0
1	6322.2	29.4	200.0	H	22.0	24.6	54.0
1	8443.5	31.0	400.0	V	110.0	23.0	54.0
1	8871.0	30.1	400.0	V	0.0	23.9	54.0
1	8926.8	30.5	400.0	H	0.0	23.5	54.0
2	1220.5	17.5	400.0	V	22.0	36.5	54.0
2	1513.9	19.3	400.0	V	22.0	34.7	54.0
2	1816.3	21.4	100.0	V	22.0	32.6	54.0
2	2490.4	20.9	400.0	V	22.0	33.1	54.0
2	2724.4	23.2	300.0	H	44.0	30.8	54.0
2	2931.0	23.2	400.0	V	22.0	30.8	54.0
2	3007.0	23.5	400.0	H	22.0	30.5	54.0
2	3570.9	25.5	400.0	H	22.0	28.5	54.0
2	4796.7	27.1	400.0	V	66.0	26.9	54.0
2	5450.5	28.2	200.0	H	330.0	25.8	54.0
2	6360.9	29.4	100.0	H	44.0	24.6	54.0
2	8175.7	29.2	200.0	V	0.0	24.8	54.0
3	1240.8	16.5	400.0	V	22.0	37.5	54.0
3	1509.9	17.7	400.0	V	22.0	36.3	54.0
3	1828.0	19.9	100.0	V	0.0	34.1	54.0
3	2206.9	18.6	400.0	V	22.0	35.4	54.0
3	2639.4	19.1	200.0	H	0.0	34.9	54.0
3	2742.0	21.3	100.0	V	0.0	32.7	54.0
3	3074.5	23.4	400.0	V	110.0	30.6	54.0
3	3328.8	23.7	400.0	H	66.0	30.3	54.0
3	4990.2	26.5	400.0	V	0.0	27.5	54.0
3	5487.9	28.1	200.0	H	330.0	25.9	54.0
3	6402.3	28.7	200.0	V	0.0	25.3	54.0
3	8645.5	30.3	300.0	H	220.0	23.7	54.0
Note : 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	Average	Height	Polarization	Azimuth	Margin	Limit
#	(MHz)	(dBμV/m)	(cm)	H /V	(deg)	(dB)	(dBμV/m)
4	1229.5	16.3	400.0	V	22.0	37.7	54.0
4	1540.5	17.9	400.0	V	66.0	36.1	54.0
4	1830.3	20.0	100.0	V	0.0	34.0	54.0
4	2411.2	19.8	400.0	H	44.0	34.2	54.0
4	2745.1	21.3	100.0	V	0.0	32.7	54.0
4	3168.6	22.4	100.0	H	0.0	31.6	54.0
4	4578.4	26.9	200.0	H	286.0	27.1	54.0
4	5491.9	27.8	200.0	H	264.0	26.2	54.0
4	6405.4	29.5	200.0	H	22.0	24.5	54.0
4	8236.0	30.2	100.0	H	286.0	23.8	54.0
4	1236.3	17.4	400.0	V	66.0	36.6	54.0
4	1489.6	18.6	100.0	H	0.0	35.4	54.0
5	1719.6	18.7	100.0	H	0.0	35.3	54.0
5	1842.9	23.2	300.0	H	0.0	30.8	54.0
5	2355.4	19.6	100.0	H	0.0	34.4	54.0
5	2765.4	25.9	200.0	H	22.0	28.1	54.0
5	3484.5	24.1	100.0	H	0.0	29.9	54.0
5	4609.0	27.2	200.0	H	330.0	26.8	54.0
5	5531.1	28.2	200.0	H	286.0	25.8	54.0
5	6449.1	30.6	100.0	H	44.0	23.4	54.0
5	6453.6	29.3	100.0	H	22.0	24.7	54.0
5	8291.4	30.2	100.0	V	0.0	23.8	54.0
6	1166.5	19.0	400.0	V	154.0	35.0	54.0
6	1475.2	19.8	200.0	H	132.0	34.2	54.0
6	1854.6	25.3	100.0	V	0.0	28.7	54.0
6	2481.0	20.7	200.0	H	132.0	33.3	54.0
6	2825.2	21.9	200.0	H	132.0	32.1	54.0
6	3971.8	25.8	400.0	H	132.0	28.2	54.0
6	4816.5	28.9	400.0	V	286.0	25.2	54.0
6	5564.4	29.9	100.0	H	308.0	24.1	54.0
6	6492.3	33.9	100.0	H	44.0	20.1	54.0
6	9223.3	31.2	400.0	V	198.0	22.8	54.0
Note : 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	Spurious Emission	Measured Harmonic	Height	Ant Pol	Azimuth	Limit [Fundamental – 20 dBc]	Margin	Results
#	dBμV/m	MHz	dBμV/m	cm	H / V		dBμV/m	dB	
1	103.2	1805.1	48.3	200	V	88.0	83.20	34.90	PA SS
2	100.6	1816.3	43.6	400	H	66.0	80.60	37.00	PA SS
3	89.7	1828	42.1	300	H	88.0	69.70	27.60	PA SS
4	100.8	1831.2	40.6	300	H	44.0	80.80	40.20	PA SS
5	101.8	1842.4	42.6	300	H	66.0	81.80	39.20	PA SS
6	88.1	1853.7	39.3	300	H	88.0	68.10	28.80	PA SS
Note : Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)									

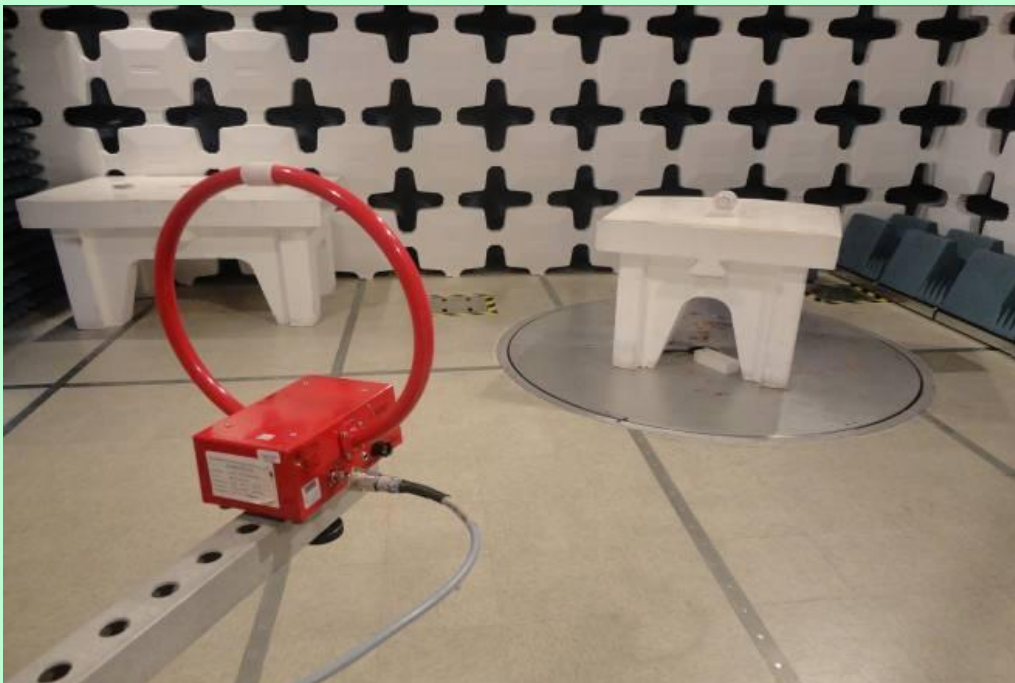
Annexure – 1

CONDUCTED RF TEST SETUP



RADIATED EMISSION SETUP

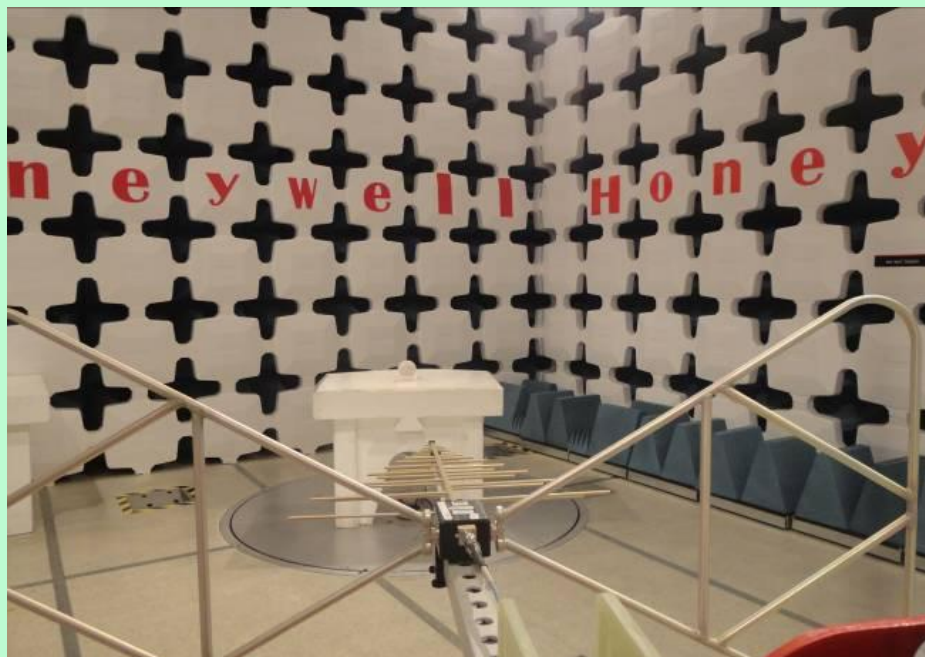
Radiated Emission Setup – 9 KHz to 30 MHz [Parallel]



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]