



Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

6.4. Radiated Emissions in Restricted and non-Restricted bands**Limits & methods:**

FCC requirements	15.247(d), 15.209, 15.205		
Test procedure	ANSI 63.10 Sections 6.5, 6.6 Radiated measurement		
Operating Frequencies	802.11b 11M – 20 MHz 802.11g 54M – 20 MHz 802.11n MCS7 – 40 MHz		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see below)

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Test procedure

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment and up to ten harmonics. The measurements were performed in hopping transmission mode of operation for carrier (channel) frequency at bottom, middle and at the top 2412MHz to 2462MHz frequency band and maximum transmitting data rate.

Results:**Range: 9kHz-30MHz**

All detected emissions in this range meet the -20dBc requirement.



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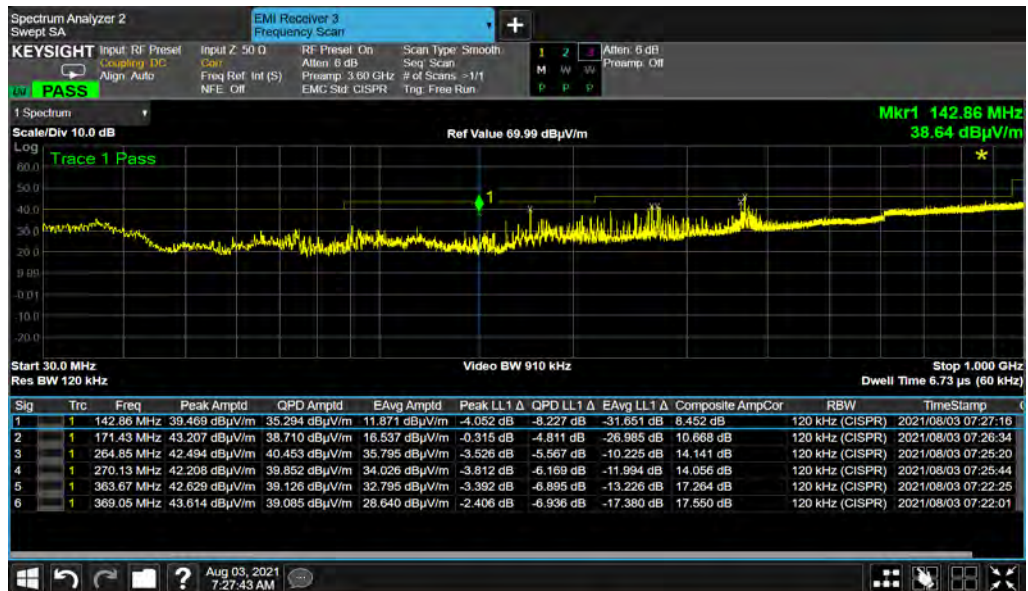
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH1 2412 MHz – modulation 802.11b 11m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP dB	Verdict	Ref. Plot #
142.860	39.469	35.29	43.52	-8.23	Pass	28
171.43	43.207	38.71	43.52	-4.81	Pass	
264.850	42.494	40.45	46.02	-5.57	Pass	
270.130	42.208	39.85	46.02	-6.17	Pass	
363.670	42.629	39.13	46.02	-6.89	Pass	
369.050	43.614	39.09	46.02	-6.94	Pass	



Plot 28

Range: 1GHz-25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2373	47.34	74	-	-26.66	Detector Pk	Pass	29
2373	36.94	-	54	-17.06	Detector Avg	Pass	29
3216	52.52	74	-	-21.48	Detector Pk	Pass	30,31
3216	46.62	-	54	-7.38	Detector Avg	Pass	30,31
5462	49.96	74	-	-24.04	Detector Pk	Pass	30, 32
5462	40.43	-	54	-13.57	Detector Avg	Pass	30,32
11498	56.74	74	-	-17.26	Detector Pk	Pass	33
11498	43.82	-	54	-10.18	Detector Avg	Pass	33
13305	56.90	74	-	-17.1	Detector Pk	Pass	34
13305	44.81	-	54	-9.19	Detector Avg	Pass	34
15510	48.40	74	-	-25.6	Detector Pk	Pass	35
15510	37.63	-	54	-16.37	Detector Avg	Pass	35



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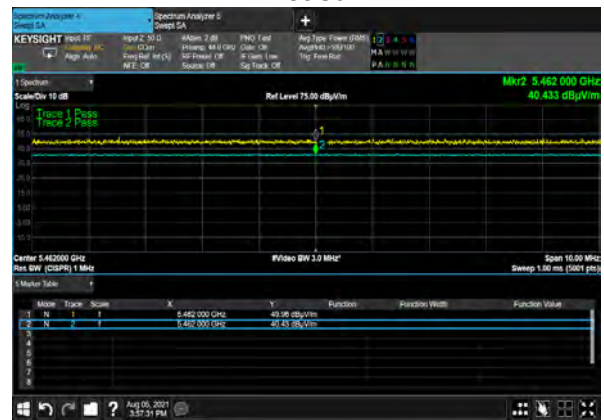
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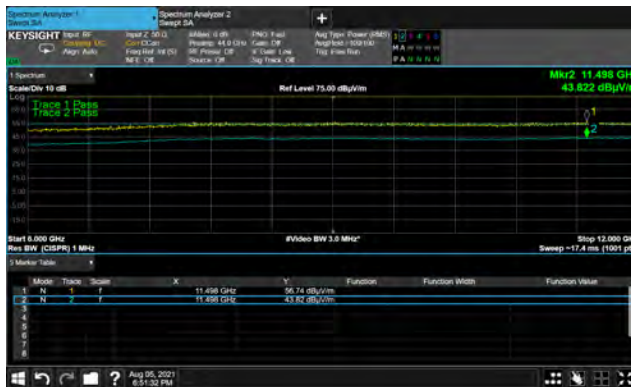
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Plot 31



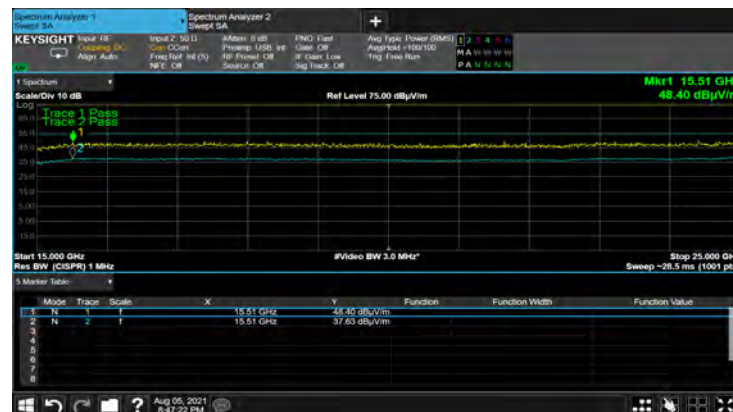
Plot 32



Plot 33



Plot 34



Plot 35



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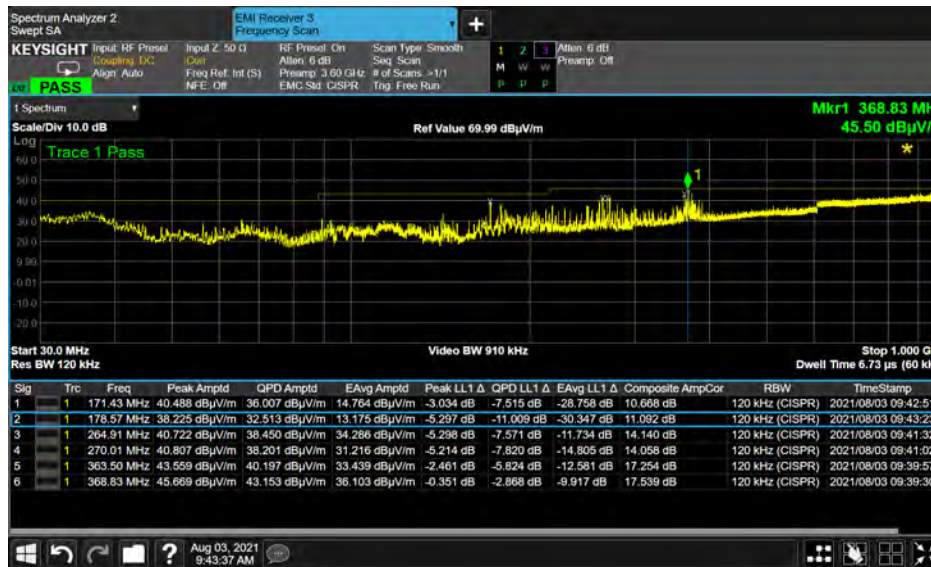
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH6 2437 MHz – modulation 802.11b 11m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP dB	Verdict	Ref. Plot #
171.43	40.488	36.007	43.52	-7.513	Pass	36
178.57	38.225	32.513	43.52	-11.007	Pass	
264.91	40.722	38.450	46.02	-7.57	Pass	
270.01	40.807	38.201	46.02	-7.819	Pass	
363.50	43.559	40.197	46.02	-5.823	Pass	
368.83	45.669	43.153	46.02	-2.867	Pass	



Plot 36

Range: 1GHz-25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2390	44.69	74	-	-29.31	Detector Pk	Pass	37
2390	34.97	-	54	-19.03	Detector Avg	Pass	37
4874.58	52.58	74	-	-21.42	Detector Pk	Pass	38,39
4874.58	43.37	-	54	-10.63	Detector Avg	Pass	38,39
3249.35	52.69	74	-	-21.31	Detector Pk	Pass	38,40
3249.35	48.56	-	54	-5.44	Detector Avg	Pass	38,40
9121	54.95	74	-	-19.05	Detector Pk	Pass	41
9121	43.87	-	54	-10.13	Detector Avg	Pass	41
14493	57.39	74	-	-16.61	Detector Pk	Pass	42
14493	45.47	-	54	-8.53	Detector Avg	Pass	42
19190	48.20	74	-	-25.8	Detector Pk	Pass	43
19190	36.54	-	54	-17.46	Detector Avg	Pass	43



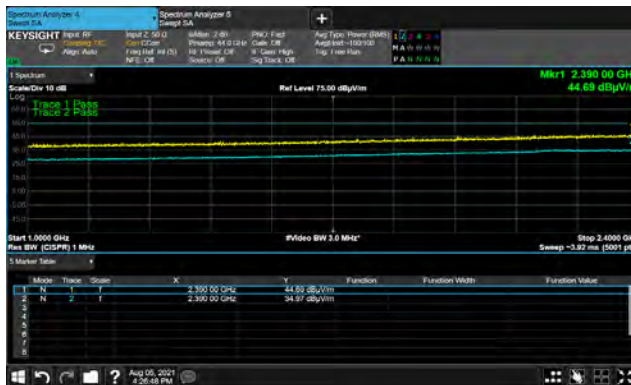
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Plot 37



Plot 38



Plot 39



Plot 40



Plot 41



Plot 42



Plot 43



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Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

CH11 2462MHz –modulation 802.11b 11m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
142.86	41.253	36.909	43.52	-6.611	Pass	44
171.43	41.767	36.552	43.52	-6.968	Pass	
249.31	38.383	36.007	46.02	-10.013	Pass	
264.79	41.648	39.691	46.02	-6.329	Pass	
270.01	42.438	39.931	46.02	-6.089	Pass	
368.77	41.320	37.830	46.02	-8.19	Pass	



Plot 44

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
1028.313	39.51	74	-	-34.49	Detector Pk	Pass	45,46
1027.947	30.87	-	54	-23.13	Detector Avg	Pass	45,46
3282.622	53.21	74	-	-20.79	Detector Pk	Pass	47,49
3282.652	48.88	-	54	-5.12	Detector Avg	Pass	47,49
4924.36	55.68	74	-	-18.32	Detector Pk	Pass	47,48
4924.08	42.64	-	54	-11.36	Detector Avg	Pass	47,48
9121	54.95	74	-	-19.05	Detector Pk	Pass	50
9121	43.87	-	54	-10.13	Detector Avg	Pass	50
13308	55.23	74	-	-18.77	Detector Pk	Pass	51
13308	44.81	-	54	-9.19	Detector Avg	Pass	51
19190	48.20	74	-	-25.8	Detector Pk	Pass	52
19190	36.54	-	54	-17.46	Detector Avg	Pass	52



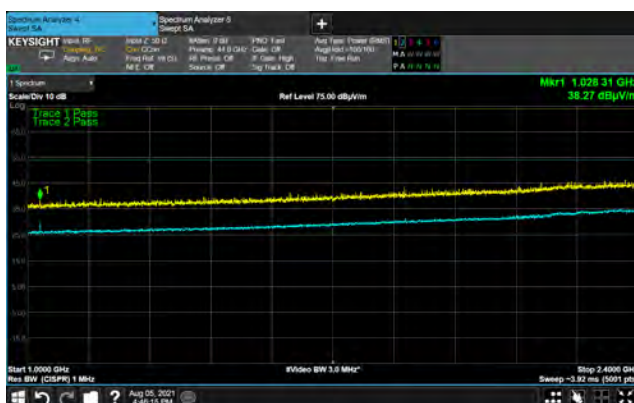
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Model: NBX-R1000-RF

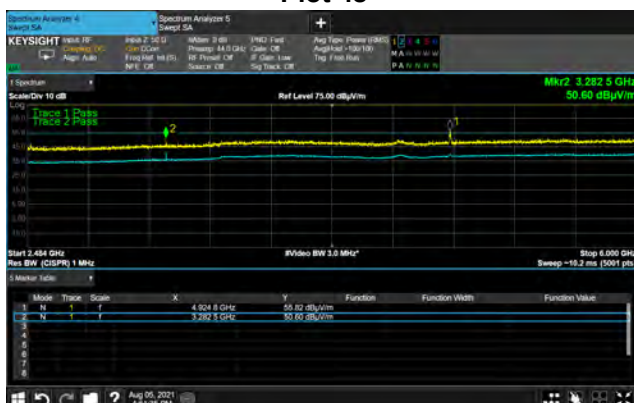
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Plot 45



Plot 46



Plot 47



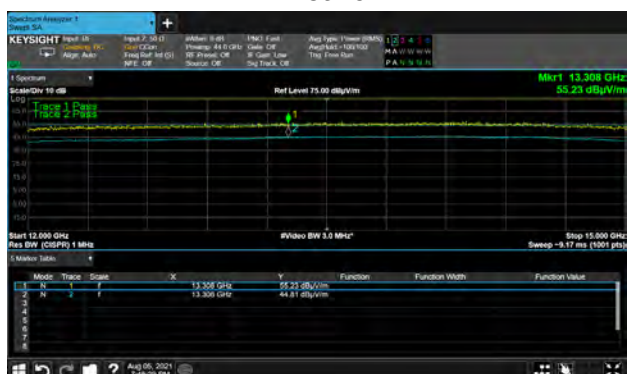
Plot 48



Plot 49



Plot 50



Plot 51



Plot 52



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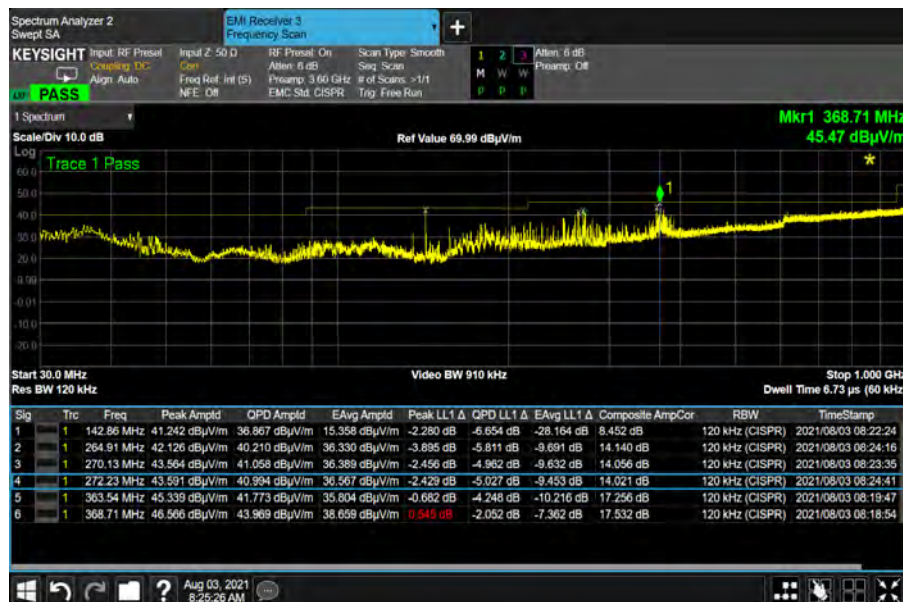
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

CH1 2412 MHz – modulation 802.11g 54m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
142.86	41.242	36.867	43.52	-6.653	Pass	53
264.91	42.126	40.210	46.02	-5.81	Pass	
270.13	43.564	41.058	46.02	-4.962	Pass	
272.23	43.591	40.994	46.02	-5.026	Pass	
363.54	45.339	41.773	46.02	-4.247	Pass	
368.71	46.566	43.969	46.02	-2.051	Pass	



Plot 53

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2.39	45.44	74	-	-28.56	Detector Pk	Pass	54
2.39	33.48	-	54	-20.52	Detector Avg	Pass	54
3.216	52.81	74	-	-21.19	Detector Pk	Pass	55,56
3.216	48.64	-	54	-5.36	Detector Avg	Pass	55,56
11.430	56.19	74	-	-17.81	Detector Pk	Pass	57
11.430	44.04	-	54	-9.96	Detector Avg	Pass	57
14.486	57.59	74	-	-16.41	Detector Pk	Pass	58
14.486	45.70	-	54	-8.3	Detector Avg	Pass	58
18.22	48.54	74	-	-25.46	Detector Pk	Pass	59
18.22	37.43	-	54	-16.57	Detector Avg	Pass	59



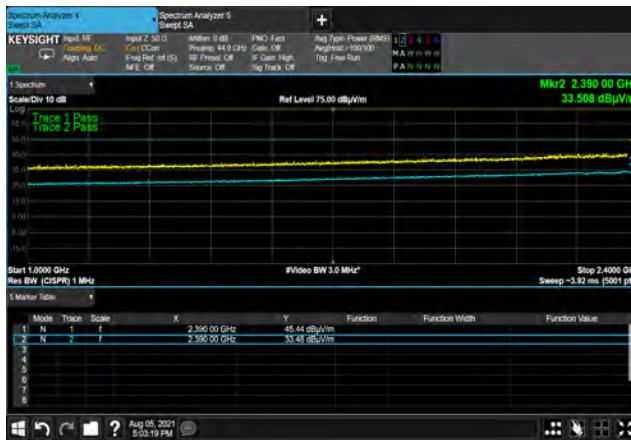
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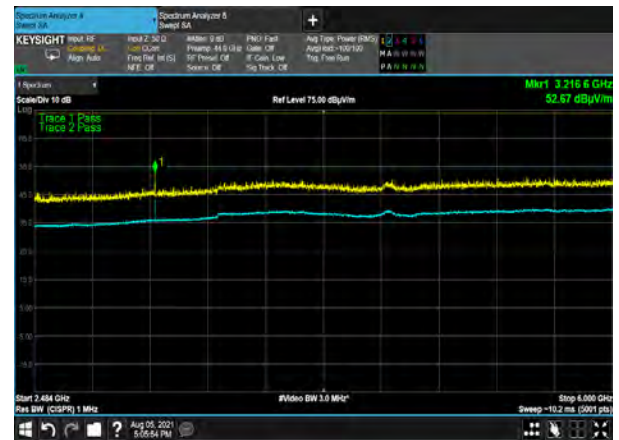
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF



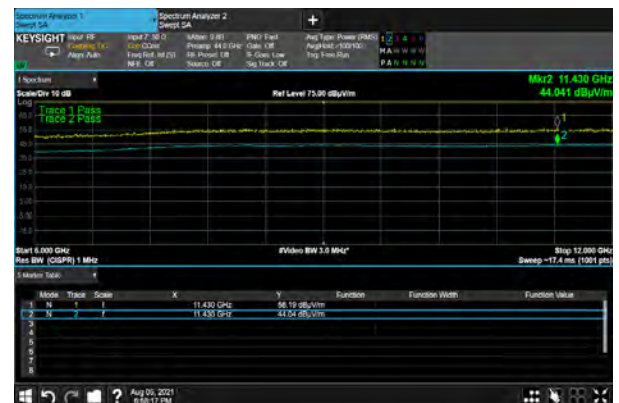
Plot 54



Plot 55



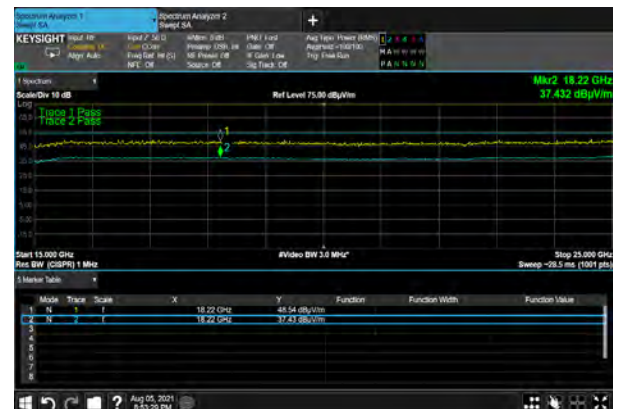
Plot 56



Plot 57



Plot 58



Plot 59



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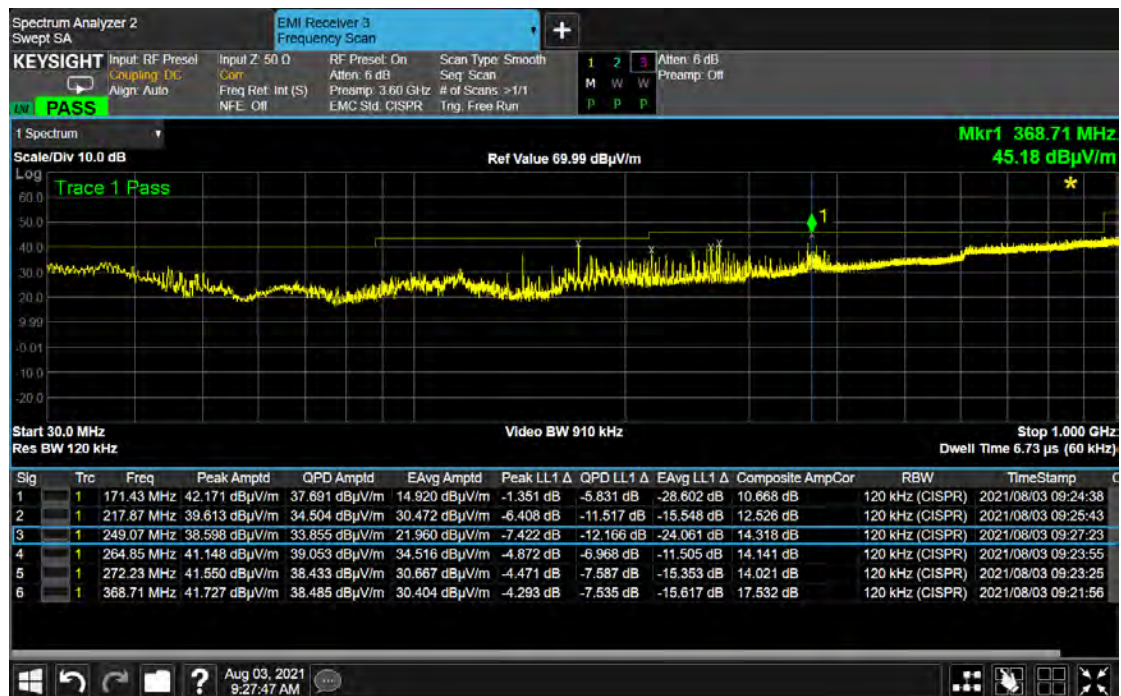
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH6 2437MHz –modulation 802.11g 54m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
171.43	42.171	37.691	43.52	-5.829	Pass	60
217.87	39.613	34.504	46.02	-11.516	Pass	
249.07	38.598	33.855	46.02	-12.165	Pass	
264.85	41.148	39.053	46.02	-6.967	Pass	
272.23	41.550	38.433	46.02	-7.587	Pass	
368.71	41.727	38.485	46.02	-7.535	Pass	



Plot 60

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2.39	47.55	74	-	-26.45	Detector Pk	Pass	61
2.39	34.46	-	54	-19.54	Detector Avg	Pass	61
3.249	53.61	74	-	-20.39	Detector Pk	Pass	62,63
3.249	49.3	-	54	-4.7	Detector Avg	Pass	62,63
10.665	55.3	74	-	-18.7	Detector Pk	Pass	64
10.665	43.00	-	54	-11	Detector Avg	Pass	64
13.307	57.13	74	-	-16.87	Detector Pk	Pass	65
13.307	45.48	-	54	-8.52	Detector Avg	Pass	65
19.46	48.45	74	-	-25.55	Detector Pk	Pass	66
19.46	36.90	-	54	-17.1	Detector Avg	Pass	66



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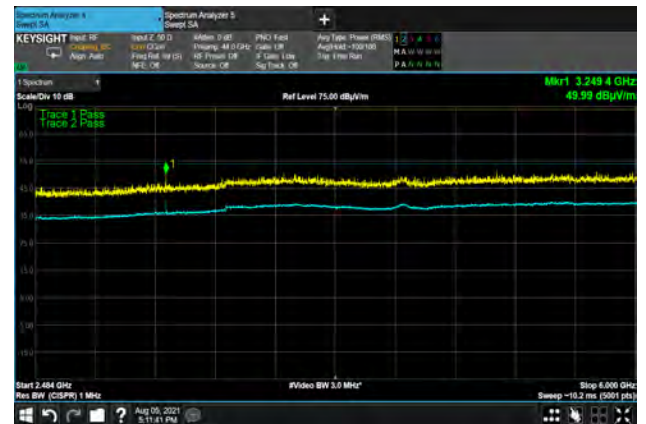
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF

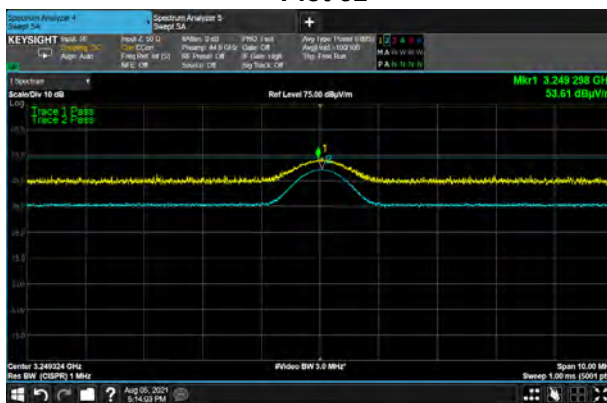
FCC ID: 2AYPY- NBX-R1000-RF



Plot 61



Plot 62



Plot 63



Plot 64



Plot 65



Plot 66



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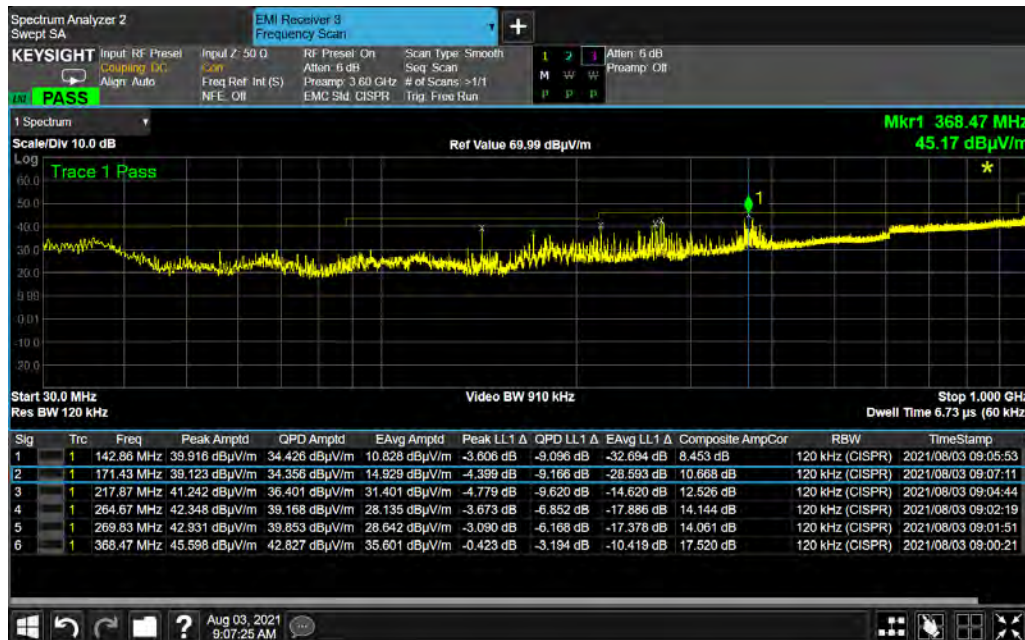
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

CH11 2462 MHz – modulation 802.11g 54m

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
142.86	39.916	34.426	43.52	-9.094	Pass	67
171.43	39.123	34.356	43.52	-9.164	Pass	
217.87	41.242	36.401	46.02	-9.619	Pass	
264.67	42.348	39.168	46.02	-6.852	Pass	
269.83	42.931	39.853	46.02	-6.167	Pass	
368.47	45.598	42.827	46.02	-3.193	Pass	



Plot 67

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
1.027	41.82	74	-	-32.18	Detector Pk	Pass	68-69
1.027	33.25	-	54	-20.75	Detector Avg	Pass	68-69
3.282	50.71	74	-	-23.29	Detector Pk	Pass	70,71
3.282	45.34	-	54	-8.66	Detector Avg	Pass	70,71
4.918	59.06	74	-	-14.94	Detector Pk	Pass	70,72
4.918	48.93	-	54	-5.07	Detector Avg	Pass	70,72
9.143	54.61	74	-	-19.39	Detector Pk	Pass	73
9.143	43.86	-	54	-10.14	Detector Avg	Pass	73
14.493	55.79	74	-	-18.21	Detector Pk	Pass	74
14.493	45.69	-	54	-8.31	Detector Avg	Pass	74
19.44	48.44	74	-	-25.56	Detector Pk	Pass	75
19.44	37.11	-	54	-16.89	Detector Avg	Pass	75

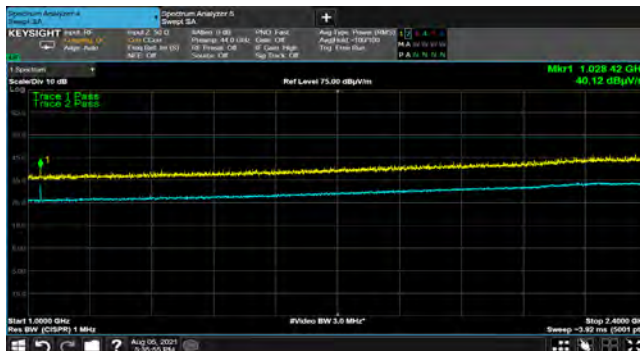


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Plot 68



Plot 69



Plot 70



Plot 71



Plot 72



Plot 73



Plot 74



Plot 75



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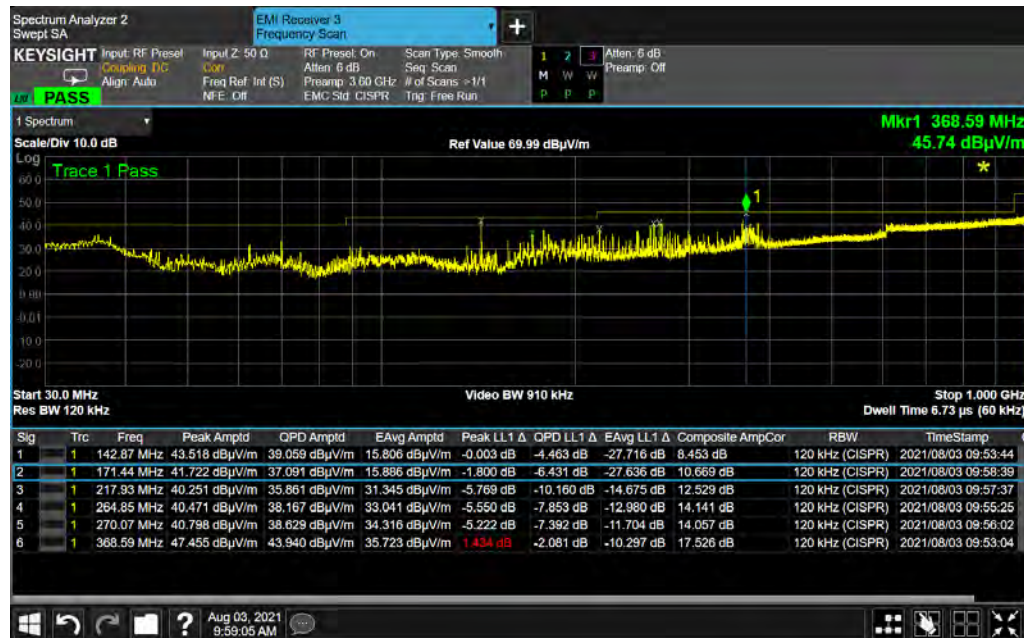
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH3 2422 MHz –modulation 802.11n MCS7 – Band 40 MHz

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
142.87	43.518	39.059	43.52	-4.461	Pass	76
171.144	41.722	37.091	43.52	-6.429	Pass	
217.93	40.251	35.861	46.02	-10.159	Pass	
264.85	40.471	38.167	46.02	-7.853	Pass	
270.07	40.798	38.629	46.02	-7.391	Pass	
368.59	47.455	43.940	46.02	-2.08	Pass	



Plot 76

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2.39	61.23	74	-	-12.77	Detector Pk	Pass	77
2.39	42.82	-	54	-11.18	Detector Avg	Pass	77
3.229	49.07	74	-	-24.93	Detector Pk	Pass	78,79
3.229	49.07	-	54	-4.93	Detector Avg	Pass	78,79
4.847	54.97	74	-	-19.03	Detector Pk	Pass	78,80
4.846	39.79	-	54	-14.21	Detector Avg	Pass	78,80
11.741	54.61	74	-	-19.39	Detector Pk	Pass	81
11.741	44.00	-	54	-10	Detector Avg	Pass	81
12.397	55.56	74	-	-18.44	Detector Pk	Pass	82
12.397	43.75	-	54	-10.25	Detector Avg	Pass	82
20.70	48.69	74	-	-25.31	Detector Pk	Pass	83
20.71	36.06	-	54	-17.94	Detector Avg	Pass	83



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Plot 77



Plot 78



Plot 79



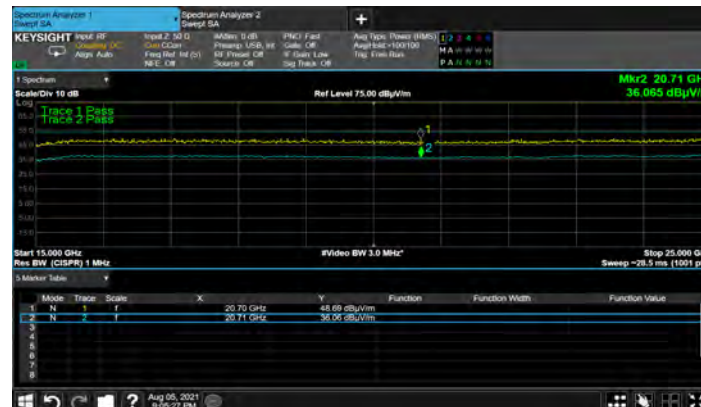
Plot 80



Plot 81



Plot 82



Plot 83



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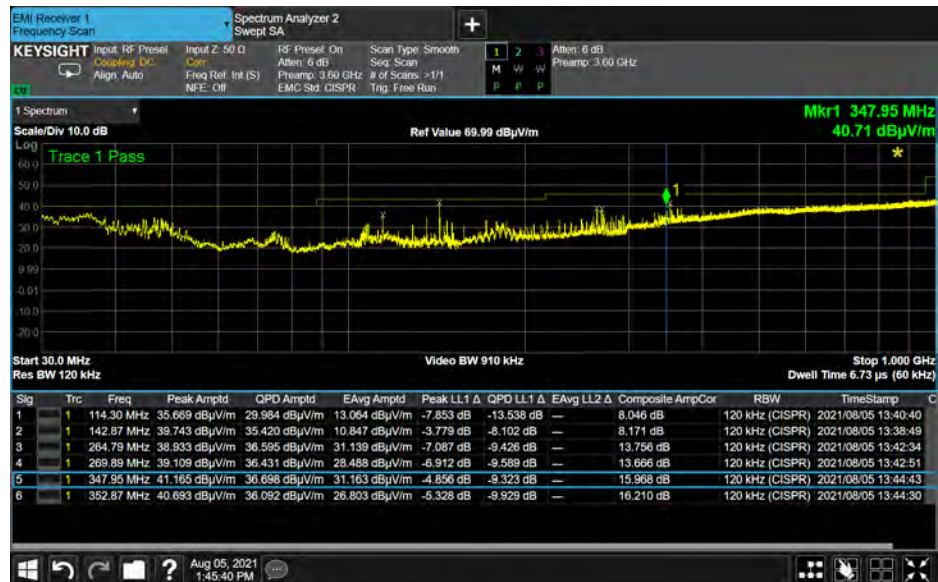
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

CH6 2437 MHz – modulation 802.11n MCS7 – Band 40 MHz

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
114.30	35.669	29.984	43.52	-13.536	Pass	84
142.87	39.743	35.420	43.52	-8.1	Pass	
264.79	38.933	36.595	46.02	-9.425	Pass	
269.89	39.109	36.431	46.02	-9.589	Pass	
347.95	41.165	36.698	46.02	-9.322	Pass	
352.87	40.693	36.092	46.02	-9.928	Pass	



Plot 84

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2.390	51.54	74	-	-22.46	DetectorPk	Pass	85
2.390	37.44	-	54	-16.56	DetectorAvg	Pass	85
2.483	52.99	74	-	-21.01	DetectorPk	Pass	86,87
2.483	40.64	-	54	-13.36	Detector Avg	Pass	86,87
3.249	53.11	74	-	-20.89	Detector Pk	Pass	86,88
3.249	47.14	-	54	-6.86	Detector Avg	Pass	86,88
4.870	56.53	74	-	-17.47	Detector Pk	Pass	86,89
4.871	45.22	-	54	-8.78	Detector Avg	Pass	86,89
11.027	55.46	74	-	-18.54	Detector Pk	Pass	90
11.027	43.40	-	54	-10.6	Detector Avg	Pass	90
13.326	56.22	74	-	-17.78	Detector Pk	Pass	91
13.326	45.38	-	54	-8.62	Detector Avg	Pass	91
20.04	48.48	74	-	-25.52	Detector Pk	Pass	92
20.04	36.67	-	54	-17.33	Detector Avg	Pass	92

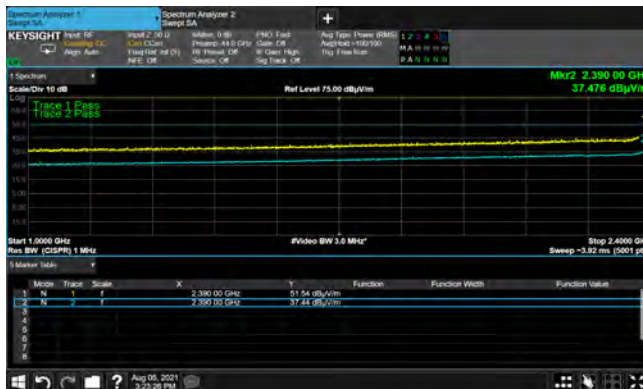


Test Report No.: 7112310971

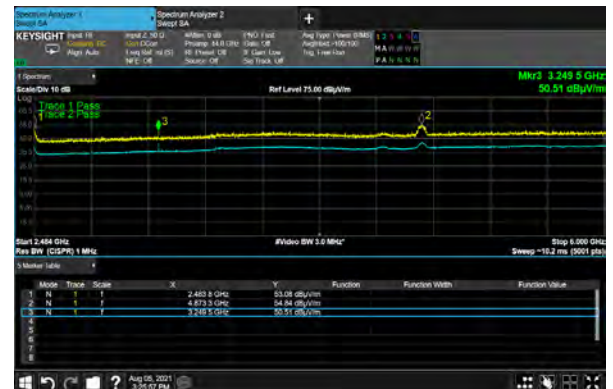
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Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF



Plot 85



Plot 86



Plot 87



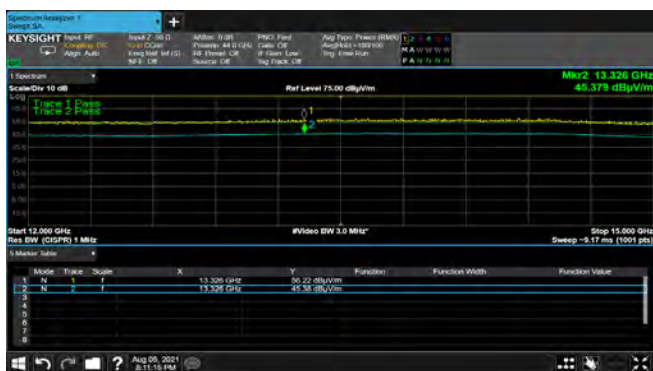
Plot 88



Plot 89



Plot 90



Plot 91



Plot 92



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Title: Test on IoT Repeater - WiFi Transceiver

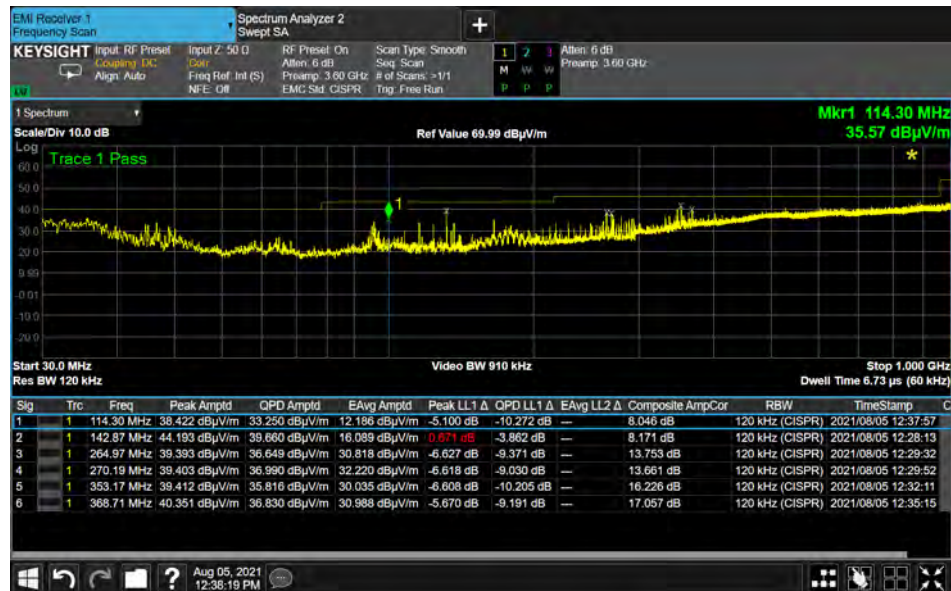
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH9 2452 MHz – modulation 802.11n MCS7 – Band 40 MHz

Range: below 1GHz

Frequency MHz	Peak, dBμV/m	QP, dBμV/m	QP Limit, dBμV/m	Delta QP, dB	Verdict	Ref. Plot #
114.30	38.422	33.250	43.52	-10.27	Pass	93
142.87	44.193	39.660	43.52	-3.86	Pass	
264.97	39.393	36.649	46.02	-9.371	Pass	
270.19	39.403	36.990	46.02	-9.03	Pass	
253.17	39.412	35.816	46.02	-10.204	Pass	
368.71	40.351	36.830	46.02	-9.19	Pass	



Plot 93

Range: 1GHz up to 25GHz

Frequency MHz	Radiated emission, dBμV/m	Peak Lim, dBμV/m	Avg Lim, dBμV/m	Margin, dB	Note	Verdict	Ref. Plot #
2.240	45.07	74	-	-28.93	Detector Pk	Pass	94
2.240	34.62	-	54	-19.38	Detector Avg	Pass	94
2.4835	66.58	74	-	-7.42	Detector Pk	Pass	95,96
2.4835	51.83	-	54	-2.17	Detector Avg	Pass	95,96
3.282	50.72	74	-	-23.28	Detector Pk	Pass	95,97
3.282	43.60	-	54	-10.4	Detector Avg	Pass	95,97
4.943	58.58	74	-	-15.42	Detector Pk	Pass	95,98
4.943	45.95	-	54	-8.05	Detector Avg	Pass	95,98
11.574	56.01	74	-	-17.99	Detector Pk	Pass	99
11.571	43.95	-	54	-10.05	Detector Avg	Pass	99
13.393	57.01	74	-	-16.99	Detector Pk	Pass	100
13.393	45.46	-	54	-8.54	Detector Avg	Pass	100
20.09	48.88	74	-	-25.12	Detector Pk	Pass	101
20.09	37.00	-	54	-17	Detector Avg	Pass	101

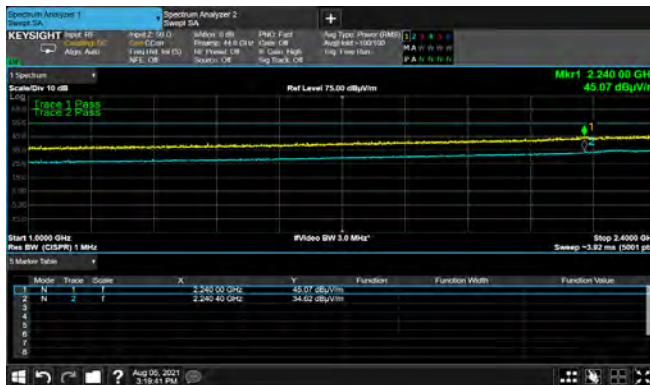


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Title: Test on IoT Repeater - WiFi Transceiver

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Plot 94



Plot 95



Plot 96



Plot 97



Plot 98



Plot 99



Plot 100



Plot 101

**Test Report No.: 7112310971****Page 41 of 50 Pages****Title:** Test on IoT Repeater - WiFi Transceiver**Model:** NBX-R1000-RF**FCC ID:** 2AYPY- NBX-R1000-RF**6.5. Band-edge compliance of RF conducted emissions****Limits & methods:**

FCC requirements	15.247(d)		
Test procedure	ANSI 63.10 Section 11.13		
Operating Freq. Band/ Modulation	802.11b 11M – 20 MHz 802.11g 54M – 20 MHz 802.11n MCS7 – 40 MHz		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

In any 100 kHz bandwidth outside the frequency band the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band

Results:

Channel#/ modulation	CH Freq. MHz	Freq MHz	Meas. Value dBm	Limit dBm	Margin dB	Remark	Ref. Plot #
CH1 and CH 11 802.11b 11m	2412	2400	-51.61	-19.57	-32.04	Pk	102,103
	2462	2483.5	-53.69	-18.57	-35.12	Pk	
CH1 and CH 11 802.11g 54m	2412	2400	-47.25	-22.50	-24.75	Pk	104,105
	2462	2483.5	-52.00	-23.36	-28.64	Pk	
CH3 and CH 9 802.11n MCS7	2422	2400	-39.16	-22.68	-16.48	Pk	106,107
	2452	2483.5	-42.47	-22.36	-20.11	Pk	



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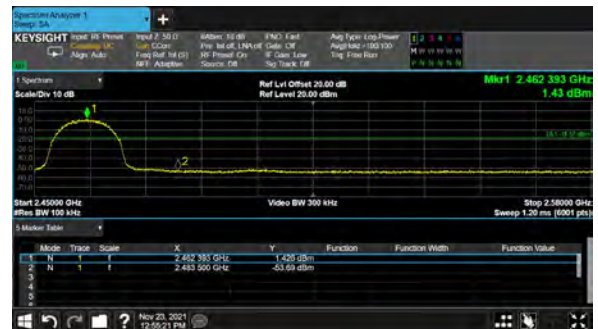
Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF



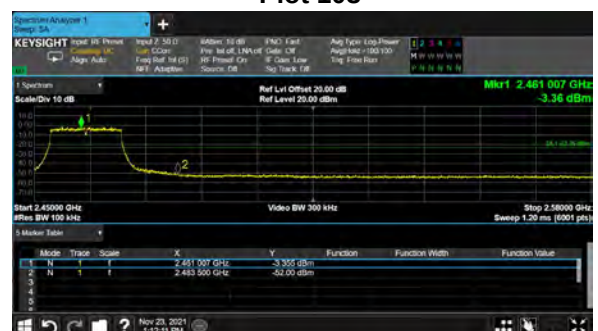
Plot 102



Plot 103



Plot 104



Plot 105



Plot 106



Plot 107



7. AC power line conducted emission measurement

Limits & methods:

FCC requirements	15.207		
Test procedure	ANSI 63.10 Section 6.2		
Ambient Temperature	22°C	Relative Humidity	46%
		Air Pressure	1006hPa

Limit:

Frequency, MHz	Class B equipment, dB (μV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases linearly with the logarithm of the frequency.

Test Procedure:

EUT was connected to 120VAC main via auxiliary PoE power supply.

The EUT was placed on a table in shielded room at a height 80 cm from floor and 40 cm from the vertical reference plane and at more than 80 cm from any other metal surfaces. The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency range as referred to in the table above. The measurements were made with quasi-peak(CISPR) and average detectors. The position of the EUT cables was varied to determine maximum emission level.

Results:

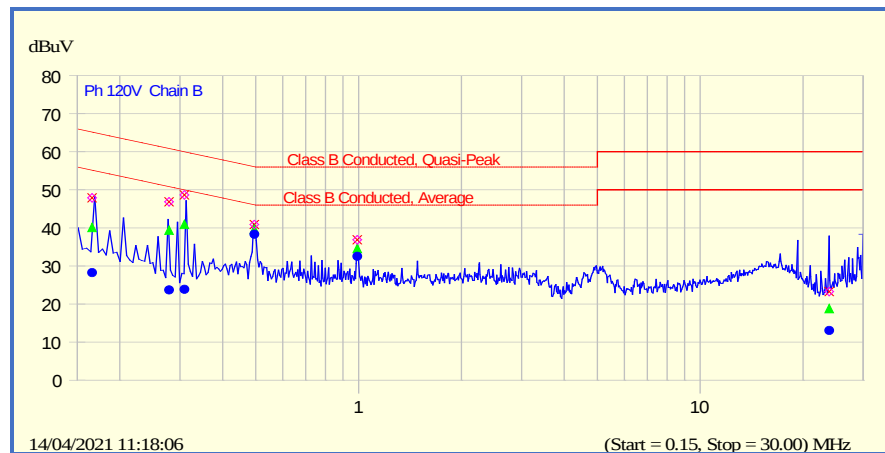
The results are presented in Plots # 108-109.

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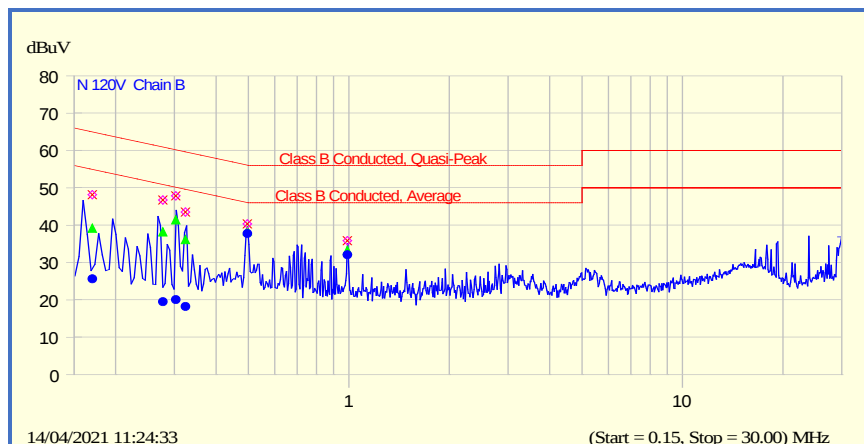
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Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF



Frequency MHz	Peak dBμV	QP dBμV	Lim QP dBμV	QP-QP Limit dB	Avg dBμV	Lim Avg dBμV	Avg - Avg Limit dB
0.17	47.9	40.1	65.2	-25.1	28.3	55.2	-26.9
0.28	46.9	39.4	60.9	-21.5	23.7	50.9	-27.1
0.31	48.7	40.9	60.0	-19.1	23.9	50.0	-26.1
0.50	40.9	39.6	56.1	-16.5	38.4	46.1	-7.7
0.99	36.9	34.6	56.0	-21.4	32.5	46.0	-13.5
23.87	23.3	18.8	60.0	-41.2	13.1	50.0	-36.9



Frequency MHz	Peak dBμV	QP dBμV	Lim QP dBμV	QP-QP Limit dB	Avg dBμV	Lim Avg dBμV	Avg - Avg Limit dB
0.17	48.2	39.2	64.9	-25.8	25.6	54.9	-29.3
0.28	46.8	38.2	60.9	-22.7	19.5	50.9	-31.4
0.30	47.9	41.4	60.2	-18.7	20.1	50.2	-30.1
0.32	43.5	36.1	59.6	-23.5	18.3	49.6	-31.3
0.50	40.4	38.5	56.1	-17.6	37.8	46.1	-8.3
0.99	35.9	33.3	56.0	-22.7	32.1	46.0	-13.9

Plot 108- Plot 109
Conducted emission on 120VAC mains. Phase & Neutral



8. Antenna requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

The antenna of the device is - built-in non detachable antenna printed on the PCB (refer to Picture #1).

There are no provisions for connection to an external antenna.

Conclusion: The unit complies with the requirement of §15.203.



Title: Test on IoT Repeater - WiFi Transceiver

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

9. Appendix 1: Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding one year.

Instrument	Manufacturer	Model	SII No.	Last calibration date	Next calibration date
EMI Analyzer 10 kHz - 26.5 GHz	HP	E7405A	4944	09/20	09/21
EMI RECEIVER-MXE 3Hz-44GHz	Agilent	N9038B	6505208	04/21	04/22
LISN 9 kHz – 30 MHz	FCC	LISN- 50/250-32-4-16	5023	03/21	03/23
Active Receiving Loop Antenna	ETS-Lindgren	6507	00144641	11/20	04/22
Bigonilog Antenna 20 MHz - 6000 MHz	ETS-Lindgren	3142D	146490	08/19	08/21
Double Ridged Waveguide Antenna 1-18 GHz	EMCO	3115	0143138	07/21	07/23
Antenna Broad-Band Horn, 14 GHz - 40 GHz	SCHWARBEC K MESS- ELEKTRONIK	BBHA 9170	5854	06/21	06/23
Antenna Broad-Band Horn, 14 GHz - 40 GHz	SCHWARBEC K MESS- ELEKTRONIK	BBHA 9170	5854	07/21	07/23
Data +Power splitter	-	-	-	N/A	N/A
Semi Anechoic Chamber	ETS-Lindgren	RFSD-F/A-100	5002	N/A	N/A
Multi-Device Positioning Controller	ETS-Lindgren	2090	5002	N/A	N/A
Antenna Tower	ETS-Lindgren	2175	5002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	5002	N/A	N/A
Turntable	ETS-Lindgren	2188	5002	N/A	N/A
Cable RF 1 m	SUCOFLEX	104PE	21325	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm5VI	005	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm6VI	006	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm7VI	007	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm8VI	008	04/21	04/22
Attenuator 10dB 5W	-	5W	6502987	04/20	04/22
Attenuator 20dB 5W	-	5W	6502992	04/20	04/22
USB preamplifier 2 GHz – 50 GHz	Keysight	U7227F	MY 55380004	04/21	04/22
Transient limiter 0.009-200 MHz	HP	11947A	3107105	10/20	10/21
Cable	EIM	RG 214/U	8 & 10	01/21	01/22



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Title: Test on IoT Repeater - WiFi Transceiver

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10. Appendix 2: Antenna Factor and Cable Loss

Cable Loss (RG214 (6 m) + 5005 (3.8 m) + 5005 (3 m))

No.	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)
1	0.00	0.0	2.16	0.1	46.76	0.0	1011.00	0.0
2	0.11	0.0	2.27	0.1	48.10	0.7	1061.01	0.1
3	0.11	0.0	2.38	0.1	51.55	0.7	1114.70	0.1
4	0.12	0.0	2.50	0.1	54.13	0.7	1170.43	0.1
5	0.12	0.0	2.63	0.1	56.83	0.7	1228.95	0.1
6	0.13	0.0	2.76	0.1	59.68	0.8	1290.40	0.1
7	0.13	0.0	2.90	0.1	62.66	0.8	1354.92	0.1
8	0.14	0.0	3.04	0.1	65.79	0.8	1422.66	0.1
9	0.15	0.0	3.19	0.2	68.08	0.8	1493.80	0.1
10	0.16	0.0	3.35	0.2	72.54	0.9	1568.49	0.1
11	0.16	0.0	3.52	0.2	76.16	0.9	1646.81	0.1
12	0.17	0.0	3.70	0.2	79.97	0.9	1728.26	0.1
13	0.18	0.0	3.88	0.2	83.97	1.0	1813.72	0.1
14	0.19	0.0	4.08	0.2	88.17	1.0	1903.51	0.1
15	0.20	0.0	4.28	0.2	92.58	1.0	1997.83	0.1
16	0.21	0.0	4.50	0.2	97.21	1.0	2101.82	0.1
17	0.22	0.1	4.73	0.2	102.07	1.0	2207.02	0.1
18	0.23	0.1	4.96	0.2	107.17	1.1	2317.37	0.1
19	0.24	0.1	5.20	0.2	112.53	1.1	2433.24	0.1
20	0.25	0.1	5.46	0.2	118.15	1.1	2554.90	0.1
21	0.27	0.1	5.74	0.2	124.06	1.2	2682.65	0.1
22	0.28	0.1	6.02	0.2	130.26	1.2	2816.76	0.1
23	0.29	0.1	6.33	0.2	136.76	1.2	2957.62	0.1
24	0.31	0.1	6.64	0.2	143.62	1.3	3105.50	0.1
25	0.32	0.1	6.97	0.2	150.80	1.3	3260.77	0.1
26	0.34	0.1	7.32	0.2	158.34	1.3	3423.81	0.1
27	0.36	0.1	7.69	0.2	166.25	1.3	3595.00	0.1
28	0.37	0.1	8.07	0.2	174.57	1.4	3774.75	0.1
29	0.39	0.1	8.48	0.2	183.30	1.4	3963.49	0.1
30	0.41	0.1	8.90	0.2	192.46	1.5	4161.67	0.1
31	0.43	0.1	9.35	0.2	202.08	1.5	4369.75	0.1
32	0.45	0.1	9.81	0.2	212.19	1.6	4588.24	0.1
33	0.48	0.1	10.30	0.2	222.80	1.6	4817.65	0.1
34	0.50	0.1	10.82	0.2	233.94	1.6	5058.53	0.1
35	0.53	0.1	11.36	0.2	245.63	1.7	5311.46	0.1
36	0.55	0.1	11.93	0.2	257.92	1.7	5577.03	0.1
37	0.58	0.1	12.52	0.2	270.81	1.8	5855.88	0.1
38	0.61	0.1	13.15	0.2	284.35	1.8	6148.68	0.1
39	0.64	0.1	13.81	0.2	298.57	1.9	6456.11	0.1
40	0.67	0.1	14.50	0.2	313.50	1.9	6778.91	0.1
41	0.70	0.1	15.22	0.2	329.17	1.9	7117.86	0.1
42	0.74	0.1	15.98	0.2	345.63	2.0	7473.75	0.1
43	0.78	0.1	16.78	0.2	362.91	2.0	7847.44	0.1
44	0.81	0.1	17.62	0.2	381.06	2.0	8239.81	0.1
45	0.86	0.1	18.50	0.2	400.11	1.9	8651.80	0.1
46	0.90	0.1	19.43	0.2	420.12	1.9	9084.39	0.1
47	0.94	0.1	20.40	0.2	441.12	1.9	9538.61	0.1
48	0.99	0.1	21.42	0.2	463.18	1.9	10015.54	0.1
49	1.04	0.1	22.49	0.5	486.34	1.9	10516.32	0.1
50	1.09	0.1	23.62	0.4	510.65	2.2	11042.14	0.1
51	1.15	0.1	24.80	0.5	536.19	2.1	11594.25	0.1
52	1.20	0.1	26.04	0.5	563.00	2.3	12173.96	0.1
53	1.26	0.1	27.34	0.5	591.15	2.5	12782.66	0.1
54	1.33	0.1	28.71	0.4	620.70	2.4	13421.79	0.1
55	1.39	0.1	30.14	0.5	651.74	2.4	14092.88	0.1
56	1.46	0.1	31.65	0.5	684.33	2.7	14797.52	0.1
57	1.54	0.1	33.23	0.5	718.54	2.7	15537.40	0.1
58	1.61	0.1	34.88	0.5	754.47	2.6	16314.27	0.1
59	1.69	0.1	36.64	0.5	792.19	2.7	17129.98	0.1
60	1.78	0.1	38.47	0.6	831.80	2.7	17986.48	0.1
61	1.87	0.1	40.39	0.6	873.39	2.9	18880.00	0.1
62	1.96	0.1	42.41	0.6	917.06	2.8		
63	2.06	0.1	44.53	0.6	962.92	2.9		



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Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

Antenna Factor

Biconilog Antenna Model No: 3142D Ser.No: 146490. 3 m distance

No.	f / MHz	ACF / dB/m	f / MHz	AF / dB/m
1	30	24.163	200	16.944
2	35	21.253	250	19.108
3	40	18.627	300	20.008
4	45	16.523	400	22.244
5	50	15.030	500	24.997
6	60	13.445	600	26.581
7	70	13.336	700	27.633
8	80	12.720	800	28.829
9	90	13.742	900	30.078
10	100	14.809	1000	30.820
11	120	13.716	1250	33.670
12	140	14.187	1500	36.896
13	160	14.964	1750	34.459
14	180	16.537	2000	35.148

Antenna Factor

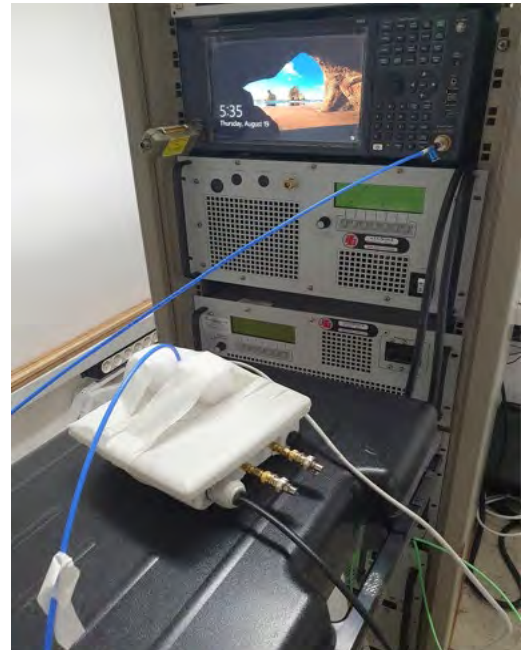
Double Ridged Waveguide Horn Antenna manufacturer EMCO Type 3115
1 GHz to 18 GHz. 3 m distance

No.	f / MHz	AF / dB/m	f / MHz	AF / dB/m	f / MHz	AF / dB/m
1	1000	23.6	7000	36.6	13000	39.7
2	1500	25.5	7500	37.3	13500	40.3
3	2000	28.2	8000	37.0	14000	41.0
4	2500	27.6	8500	37.4	14500	40.8
5	3000	29.2	9000	37.7	15000	39.4
6	3500	30.5	9500	38.0	15500	38.8
7	4000	31.7	10000	38.2	16000	39.0
8	4500	31.9	10500	38.5	16500	40.1
9	5000	32.7	11000	38.6	17000	40.8
10	5500	33.8	11500	38.9	17500	42.2
11	6000	35.2	12000	38.8	18000	42.3
12	6500	35.7	12500	39.0		

11. Appendix 3: Test illustrations



Picture 1
Connection to internal WiFi antenna.



Picture 2
RF Conducted measurement test setup



Picture 3.
LAN-Power Splitter to use PoE technology



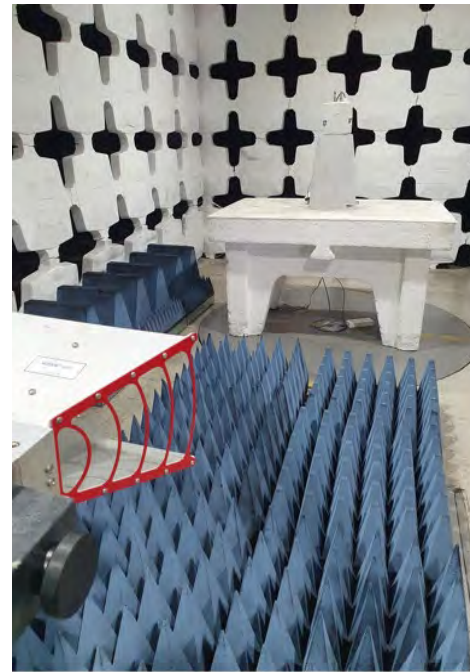
Picture 4.
AC power Adapter

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Picture 5
Radiated spurious emission test setup.

END OF THE DOCUMENT