



CERTIFICATION TEST REPORT

Report Number. : 13593618A

Applicant : Signify North America Corporation
O'Hare International Center
10275 W. Higgins Rd
Rosemount, IL 60018
US

Model : SNH210 MC
SNH210 IA

FCC ID : 2AF2N-SHMC

IC : 20659-SHMC

EUT Description : Lighting Control

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5 + A1

Date Of Issue:
2021-01-29

Prepared by:
UL LLC
333 Pfingsten Road
Northbrook, IL 60062
US



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	--	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Signify North America Corporation
O'Hare International Plaza
10275 W. Higgins Rd
Rosemount, IL 60018
US

EUT DESCRIPTION: Lighting Control

MODEL: SNH210 MC
SNH210 IA

SERIAL NUMBER: F3

SAMPLE RECEIPT DATE: 2020-12-03

DATE TESTED: 2020-12-03 - 2020-12-14

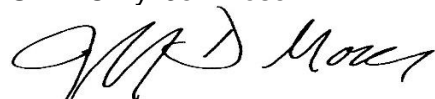
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5 + A1	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL LLC By: Jeff Moser



Operations Manager
Consumer Technology Division
UL LLC

Prepared By: Bart Mucha



Test Engineer
Consumer Technology Division
UL LLC

2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Compliant	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Compliant	None.
15.247 (e)	RSS-247 5.2 (b)	PSD	Compliant	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Compliant	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Compliant	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1, and RSS-247 Issue 2.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, Illinois, USA.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input checked="" type="checkbox"/>	Building: 333 Pfingsten Road Northbrook, IL 60062	US0065	2180A	152210

UL NBK is accredited by NVLAP, Laboratory Code 100414-0

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	3.31 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Conducted Antenna Port Emission	3.05 dB

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a ceiling mount wireless light controller with Bluetooth LE and ZigBee radios. This report is for the Bluetooth LE radio only. See report number 13593618B for ZigBee data. Simultaneous operation between the two radios is not possible.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	5.59	3.62

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 2.5dBi

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v1.1.5.1607

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, and power line conducted emission were performed with the EUT set to transmit at the middle channel.

Band edge and radiated emissions between 1GHz and 25GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

EUT is installed in single orientation only

6.1. MODEL DIFFERENCES

There is no consdifference between the two models listed in report. The SNH210 MC sensors use radio technology to create a simple solution for a stand-alone indoor lighting system, named MasterConnect (MC), while the EasySense SNH210 IA sensors use radio technology to create a solution for a fully networked indoor lighting system, named InterAct (IA).

6.2. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer/Brand	Model	Serial Number	FCC ID
Ballast	Philips	XI040C110V054VP	-	-

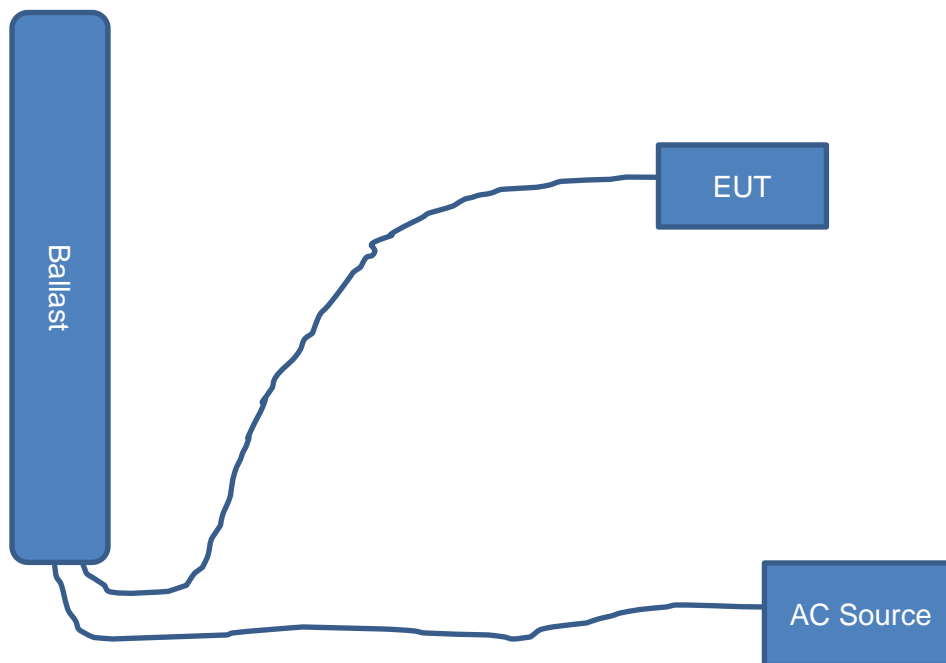
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Power	1	push in	2 wire	1 m	n/a
2	AC	1	push in	3 wire	1.5 m	n/a

TEST SETUP

The EUT is programmed with NFC device to specific operating mode. NFC programmer is removed and is not needed during testing.

SETUP DIAGRAMS



7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10 Subclause 11.6

6 dB BW: ANSI C63.10 Subclause -11.8.1 $RBW \geq DTS \text{ BW}$

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.1 $RBW \geq DTS \text{ bandwidth}$

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Conducted emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11, 6.10.4

Radiated emissions restricted frequency bands and bandedges: ANSI C63.10 Subclause -
11.12.1 , 6.10.5

Radiated Spurious Emissions: ANSI C63.10-2013 Section 6.3-6.6

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, June 15, 2019
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	2019-12-28	2020-12-31
Bicon Antenna	Electro-Metrics	EM6912A	EMC4070	2019-12-31	2020-12-31
Log-P Antenna	Chase	UPA6109	EMC4258	2019-12-31	2020-12-31
Loop Antenna	EMCO	6502/1	EMC4026	2020-01-28	2021-01-31
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	2019-12-26	2020-12-31
Antenna Array	UL	BOMS	EMC4276	2020-07-02	2021-07-31
Signal Analyzer	Aglient	N9030A PXA	EMC4360	2019-12-22	2020-12-31

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

The EUT was set to 100% duty cycle and it was verified that it operates at 100% duty cycle.

9.2. 99% BANDWIDTH

LIMITS

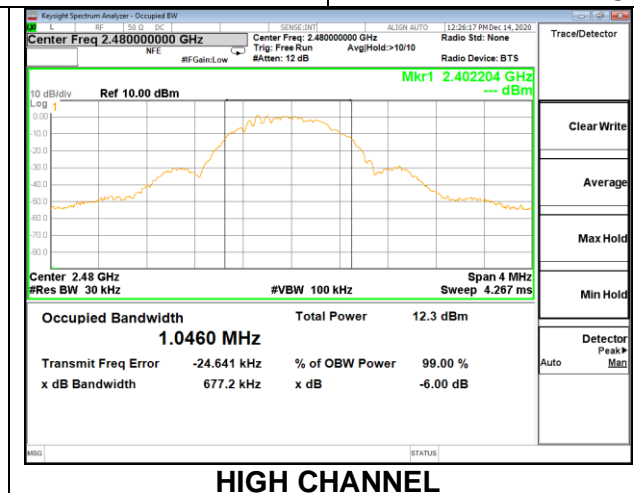
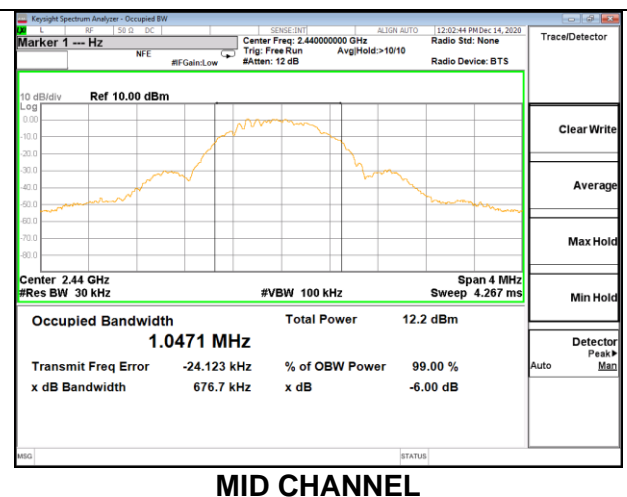
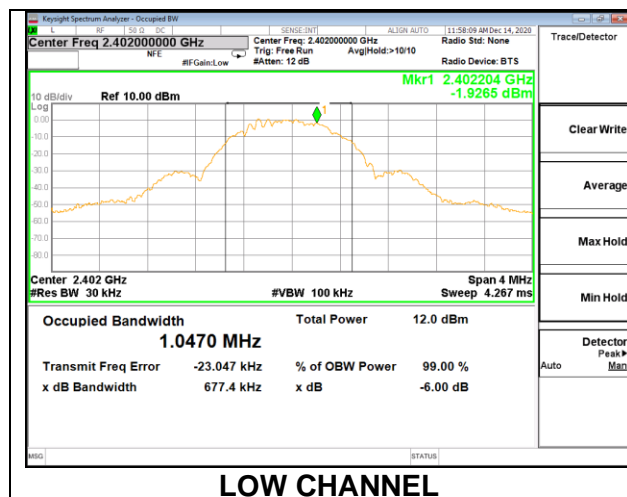
None; for reporting purposes only.

RESULTS

Tested By:	bm06740
Date:	2020-12-14

9.2.1. BLE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0470
Middle	2440	1.0471
High	2480	1.0460



9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

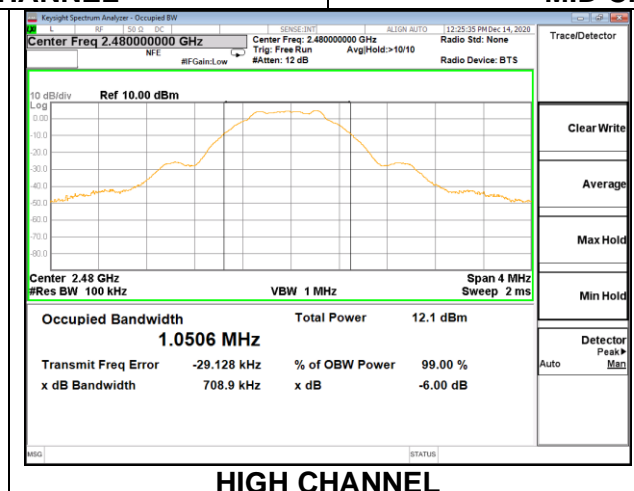
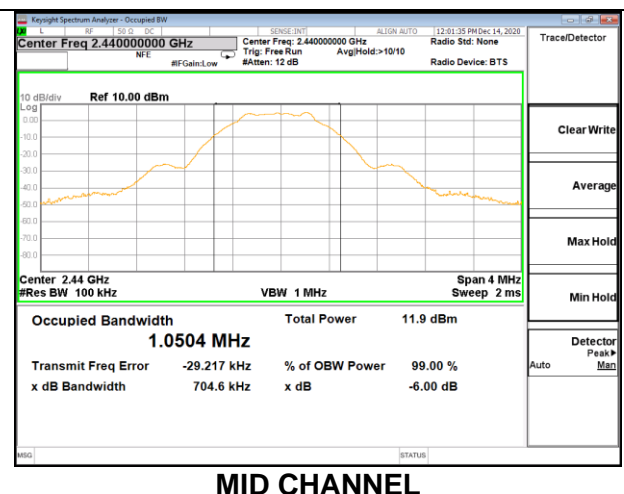
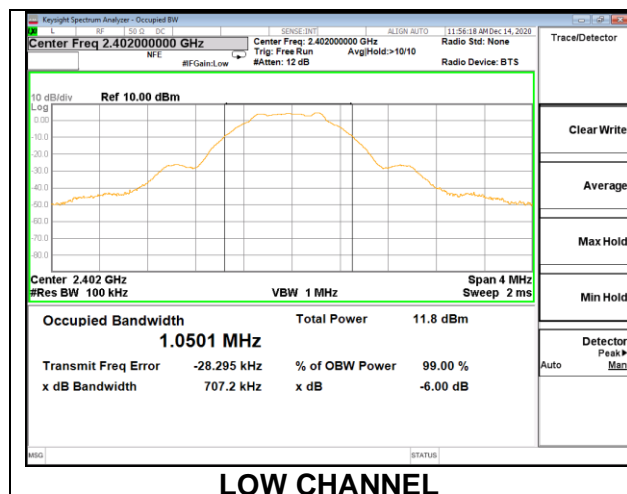
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Tested By:	bm06740
Date:	2020-12-14

9.3.1. BLE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7072	0.5
Middle	2440	0.7046	0.5
High	2480	0.7089	0.5



9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

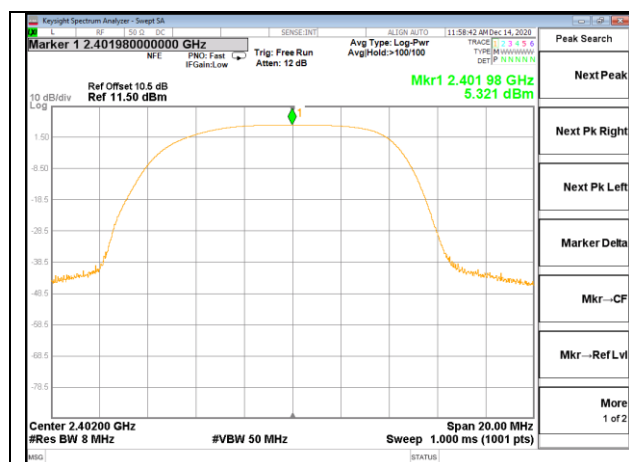
The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for a gated peak reading of power.

RESULTS

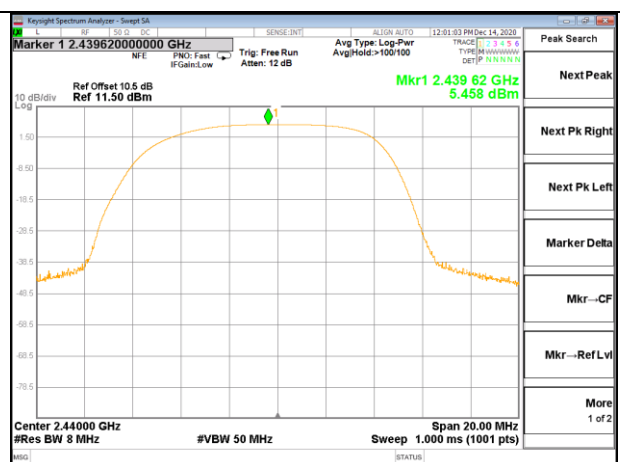
Tested By:	bm06740
Date:	2020-12-14

9.4.1. BLE

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.321	30	-24.679
Middle	2440	5.458	30	-24.542
High	2480	5.586	30	-24.414



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)
RSS-247 (5.2) (b)

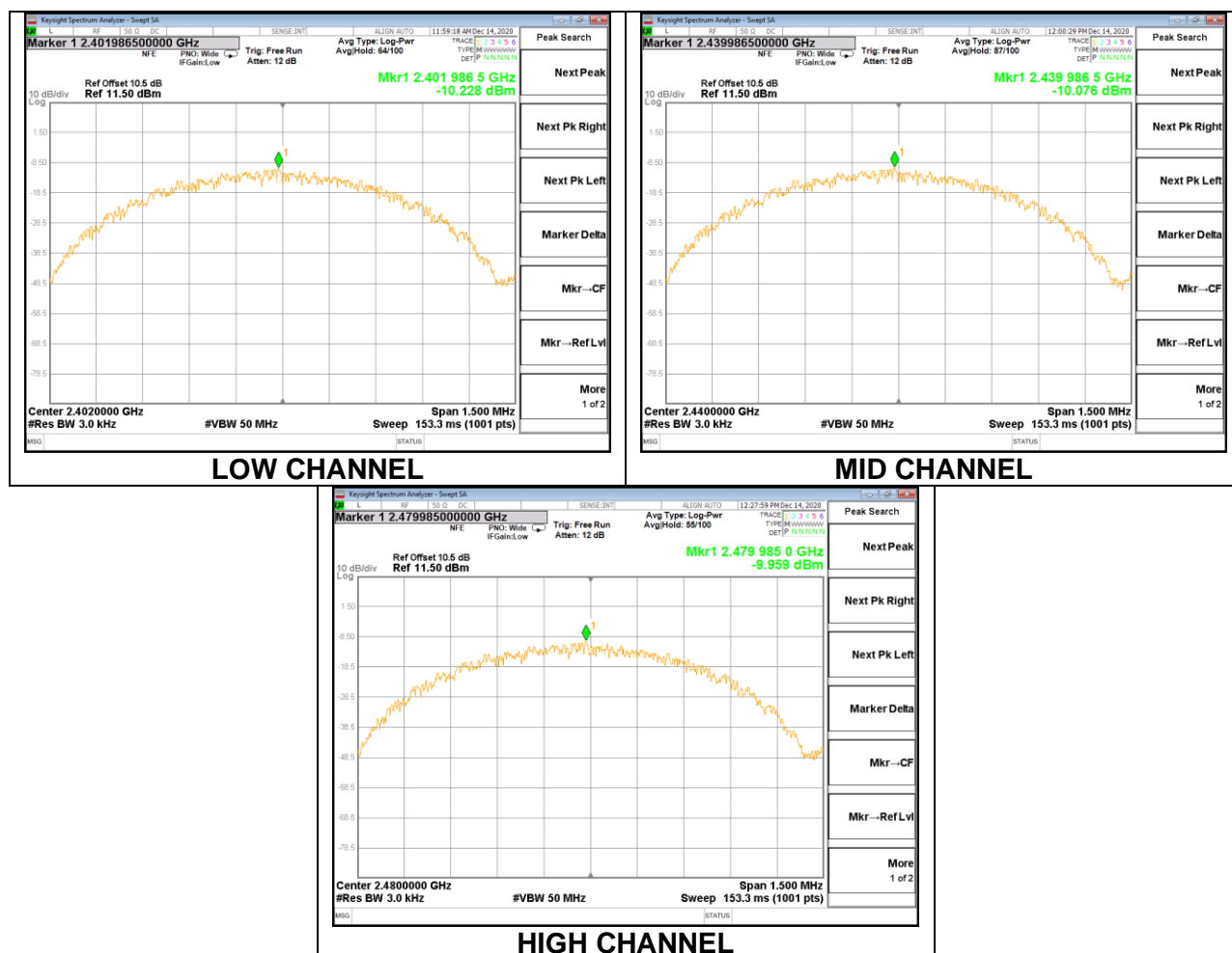
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

Tested By:	bm06740
Date:	2020-12-14

9.5.1. BLE

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-10.23	8	-18.23
Middle	2440	-10.08	8	-18.08
High	2480	-9.96	8	-17.96



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

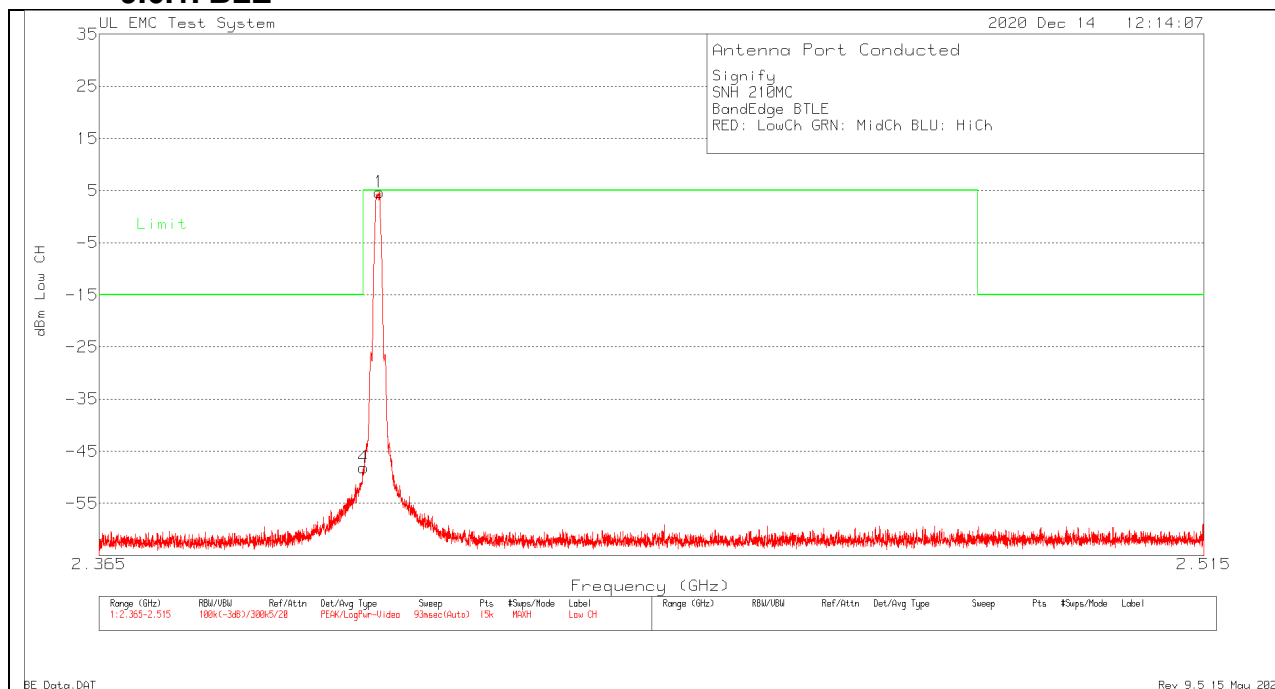
RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20dB.

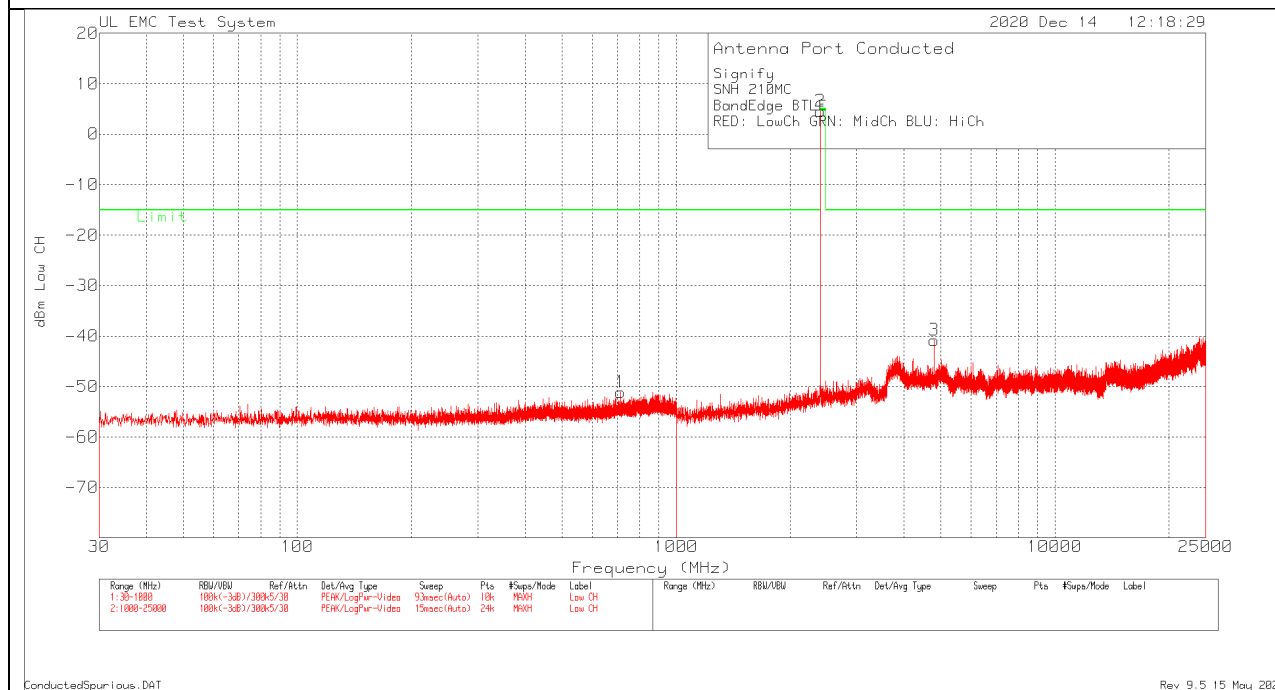
RESULTS

Tested By:	bm06740
Date:	2020-12-14

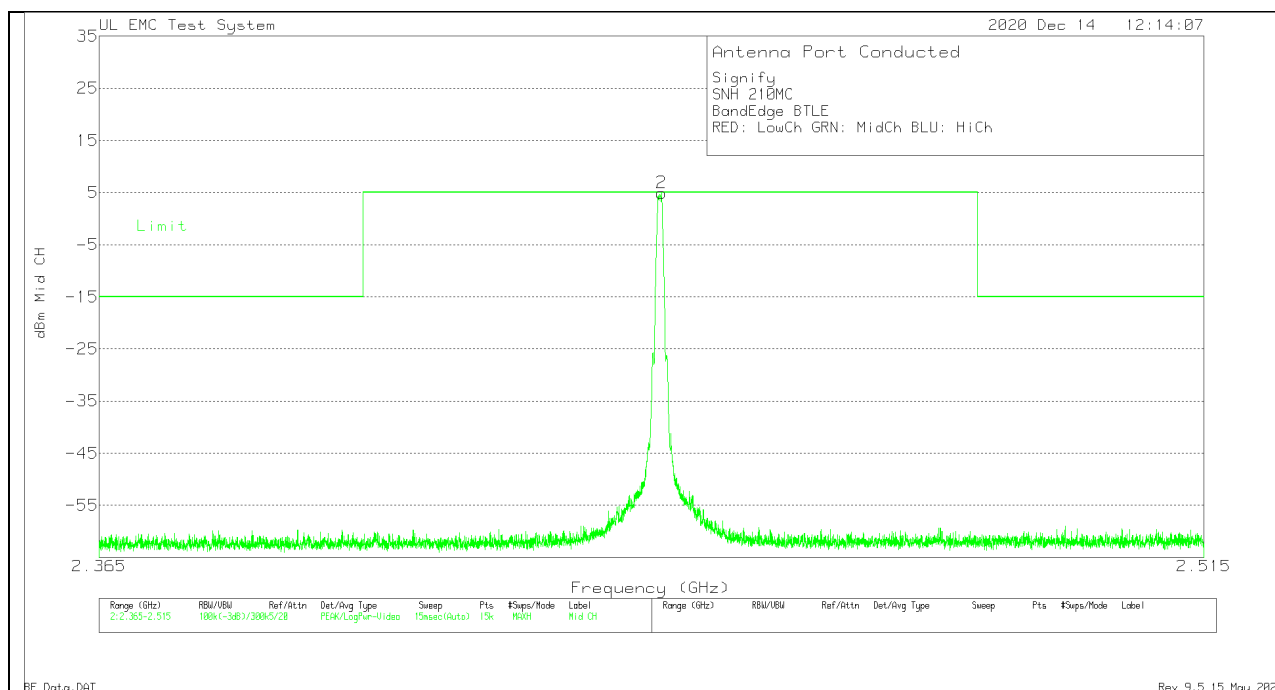
9.6.1. BLE



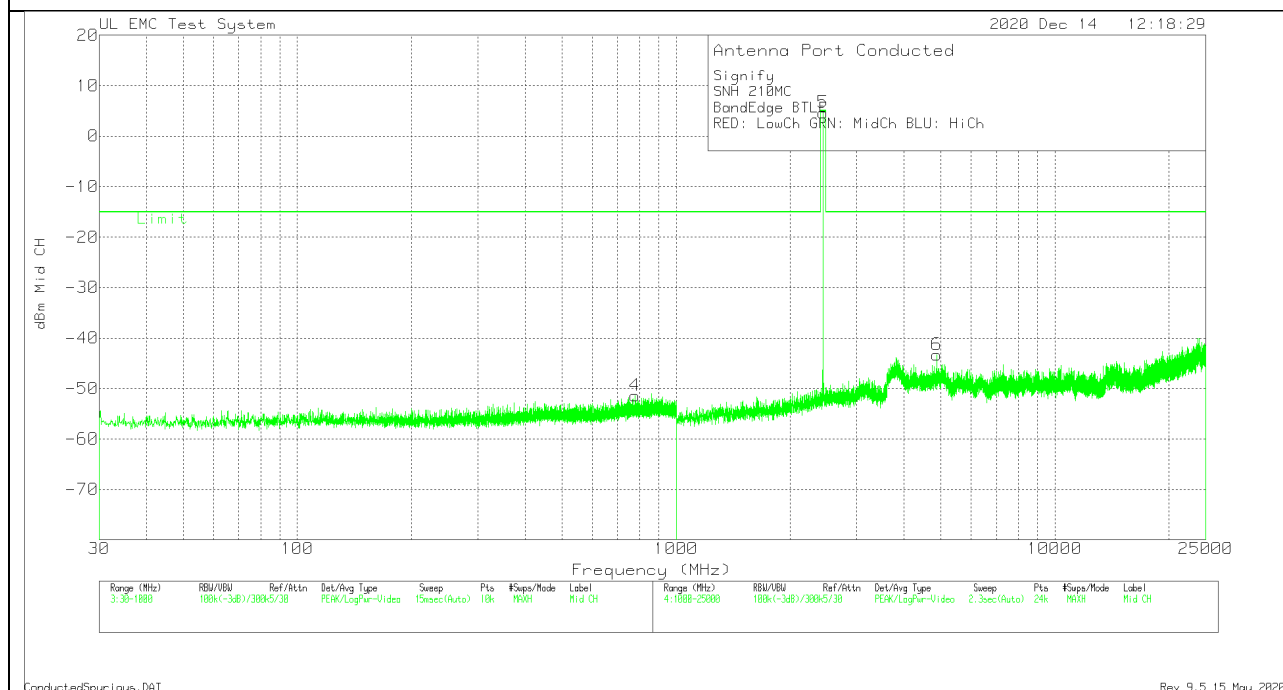
LOW CHANNEL BANDEDGE



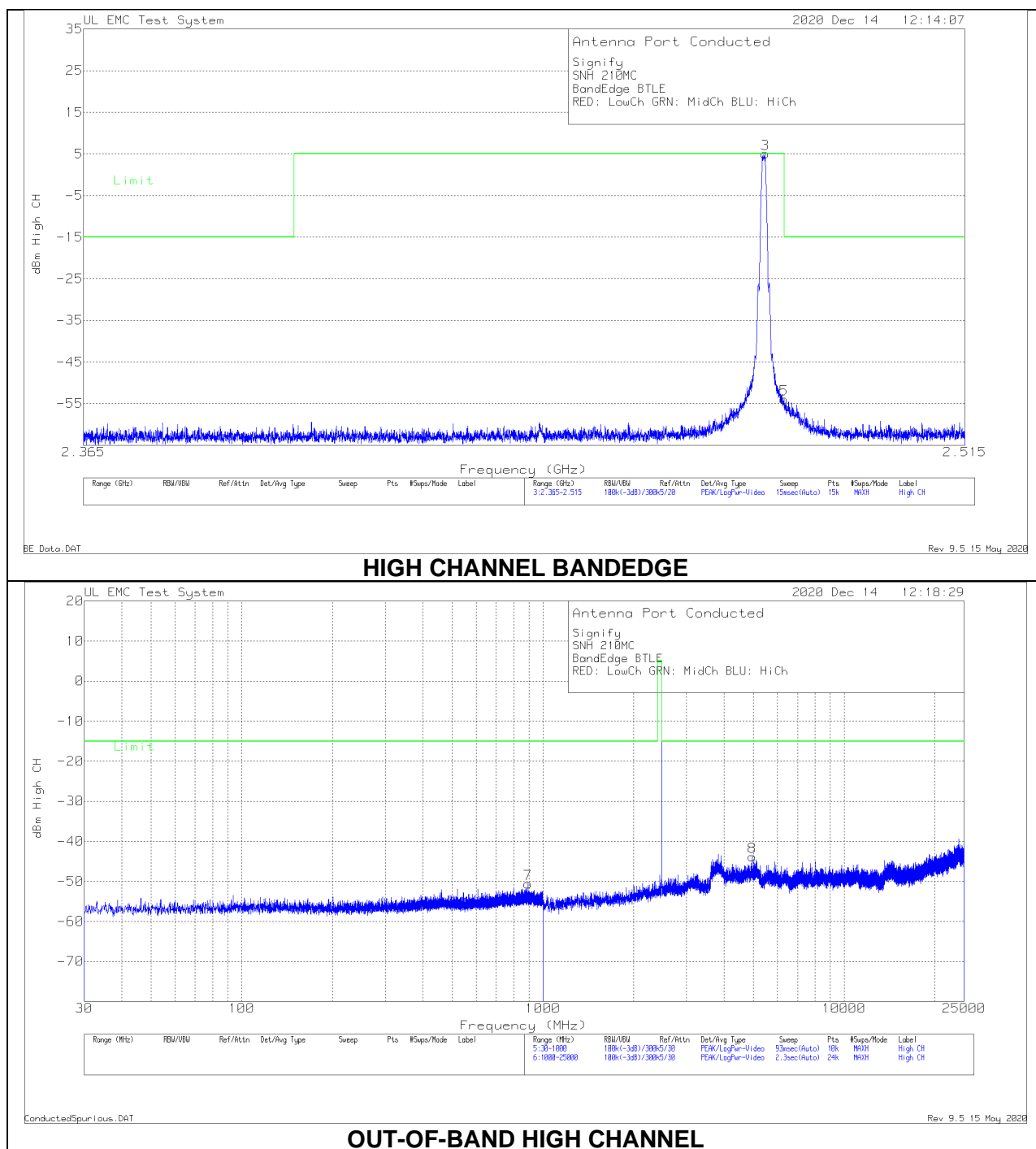
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



Bandedge Tabular Data

Signify								
SNH 210MC								
BandEdge BTLE								
RED: Low Ch GRN: MidCh BLU: HiCh								
Trace MArkers								
Marker No.	Test Frequency (GHz)	Meter Reading (dBm)	Detector	Cable Factor dB	10dB Attenuator dB	Level dBm	Limit dBm	Margin (dB)
Low Channel								
1	2.4022	-5.82	Pk	0.6	9.9	4.68	-	-
4	2.4	-58.61	Pk	0.6	9.9	-48.11	-15.01	-33.1
Middle Channel								
2	2.4402	-5.64	Pk	0.6	9.9	4.86	-	-
High Channel								
3	2.4802	-5.51	Pk	0.6	9.9	4.99	-	-
5	2.4835	-64.48	Pk	0.6	9.9	-53.98	-15.01	-38.97
Pk - Peak detector								

Conducted Spurious Tabular Data

Signify								
SNH 210MC								
BandEdge BTLE								
RED: Low Ch GRN: MidCh BLU: HiCh								
Trace MArkers								
Marker No.	Test Frequency (GHz)	Meter Reading (dBm)	Detector	Cable Factor dB	10dB Attenuator dB	Level dBm	Limit dBm	Margin (dB)
Low Channel								
1	712.7564	-61.2	Pk	0.3	9.8	-51.1	-15.08	-36.02
2	2402	-6	Pk	0.6	9.9	4.5	-	-
3	4804	-51.77	Pk	0.8	10.1	-40.87	-15.08	-25.79
Middle Channel								
4	779.3052	-61.47	Pk	0.3	9.8	-51.37	-15.08	-36.29
5	2440	-5.87	Pk	0.6	9.9	4.63	-	-
6	4880	-54.24	Pk	0.8	10.1	-43.34	-15.08	-28.26
High Channel								
7	893.098	-60.81	Pk	0.4	9.8	-50.61	-15.08	-35.53
8	4960	-54.78	Pk	0.8	10.1	-43.88	-15.08	-28.8
Pk - Peak detector								

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters for 9kHz-30MHz, 10 meters for 30MHz-1GHz, and 3 meters for 1GHz-25GHz. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3MHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements. For this test program, average measurements were made using RMS average detection with the resolution bandwidth set to 1 MHz; the video bandwidth set to 3 MHz.

The spectrum from 1 GHz to 25 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz testing was conducted on middle channel only.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

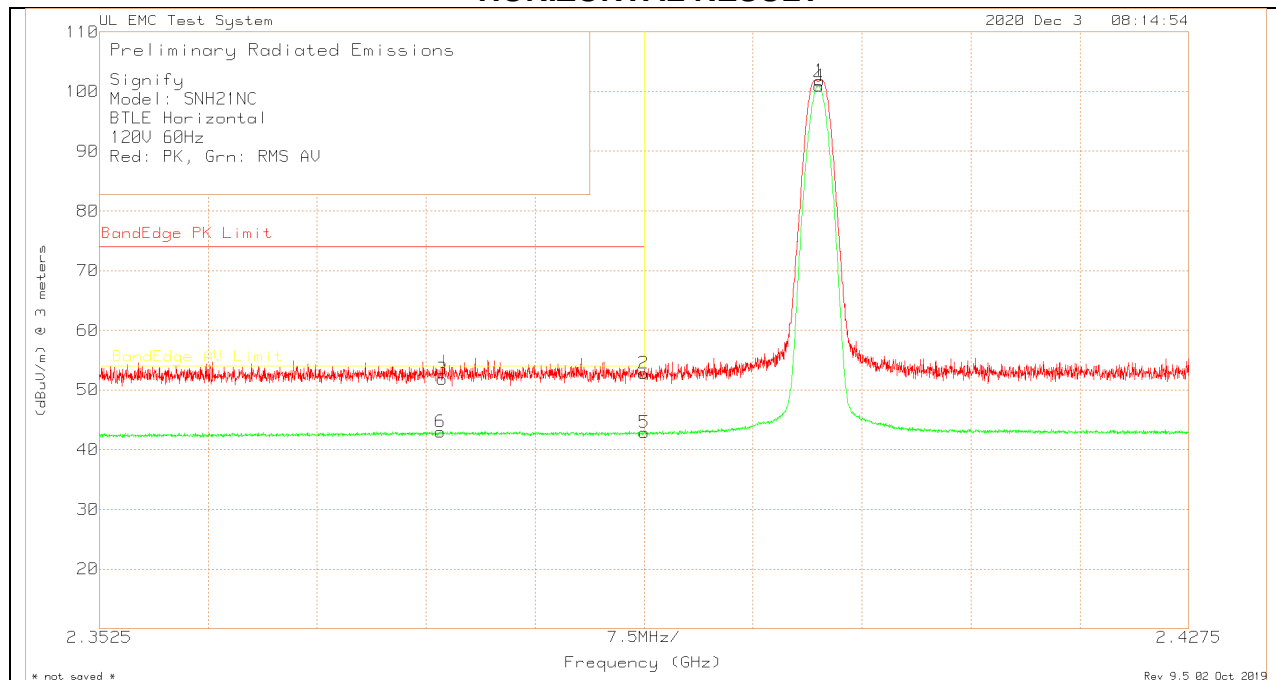
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE

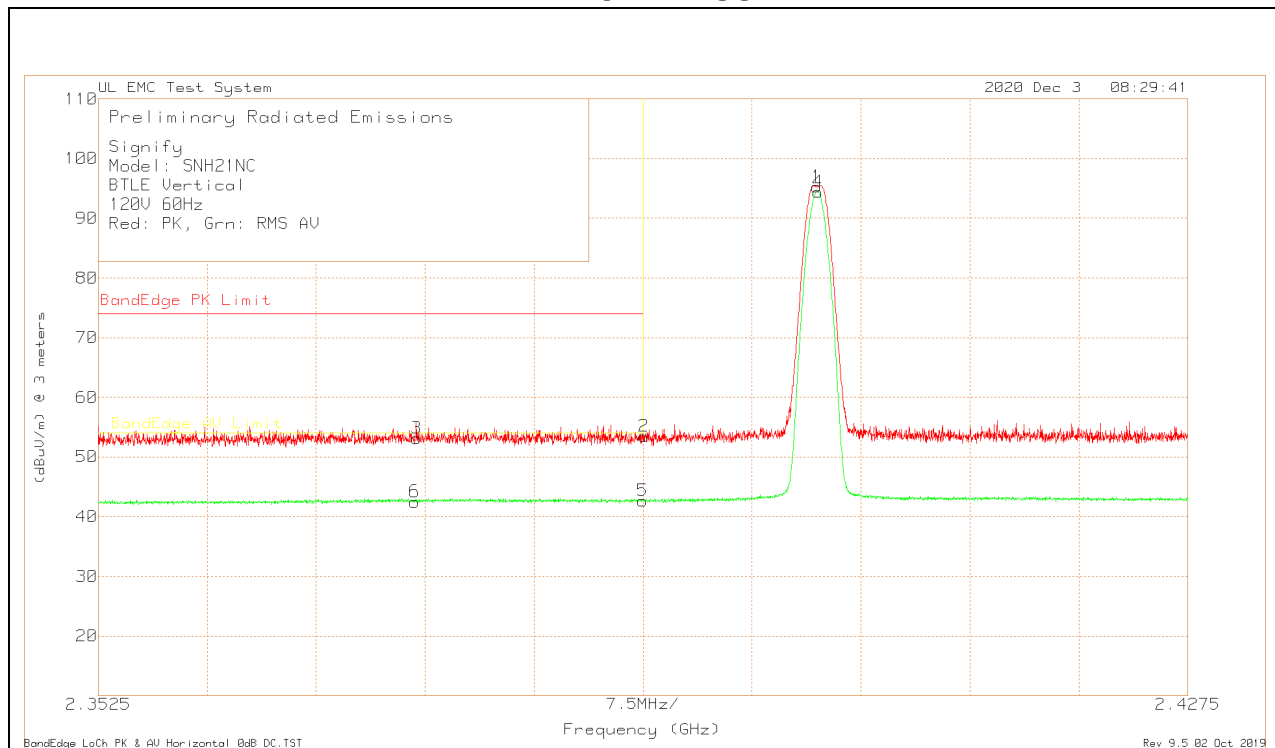
BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Signify														
Model: SNH21NC														
BTLE Horizontal														
120V 60Hz														
Red: PK, Grn: RMS AV														
Trace Markers														
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	DC Correction 100% dB	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.402	75.28	Pk	21.8	0	4.73	101.81	-	-	-	-	260	251	H
2	2.39	26.29	Pk	21.8	0	4.71	52.8	74	-21.2	-	-	260	251	H
3	2.3761	25.18	Pk	21.8	0	4.85	51.83	74	-22.17	-	-	260	251	H
4	2.402	74.4	RMS AV	21.8	0	4.73	100.93	-	-	-	-	260	251	H
5	2.39	16.39	RMS AV	21.8	0	4.71	42.9	-	-	54	-11.1	260	251	H
6	2.375975	16.35	RMS AV	21.8	0	4.85	43	-	-	54	-11	260	251	H
Pk - Peak detector														
RMS AV - RMS Average Measurement														

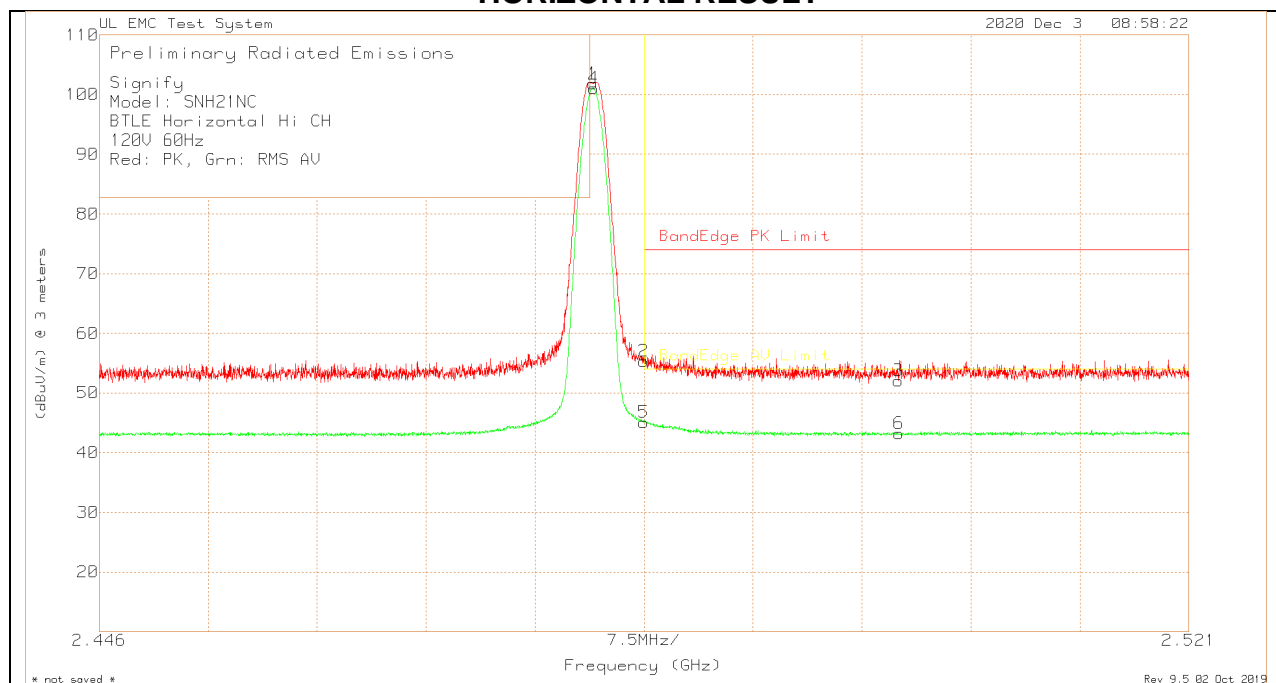
VERTICAL RESULT



Signify															
Model: SNH21NC															
BTLE Vertical															
120V 60Hz															
Red: PK, Grn: RMS AV															
Trace Markers															
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	DC Correction 100% dB	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	
1	2.402	68.75	Pk	21.8		4.73	95.28	-	-	-	-	260	251	V	
2	2.39	26.93	Pk	21.8		4.71	53.44	74	-20.56	-	-	260	251	V	
3	2.3744	26.47	Pk	21.8		4.85	53.12	74	-20.88	-	-	260	251	V	
4	2.4021	67.86	RMS AV	21.8	0	4.73	94.39	-	-	-	-	260	251	V	
5	2.39	16.17	RMS AV	21.8	0	4.71	42.68	-	-	54	-11.32	260	251	V	
6	2.3743	15.85	RMS AV	21.8	0	4.85	42.5	-	-	54	-11.5	260	251	V	
Pk - Peak detector															
RMS AV - RMS Average Measurement															

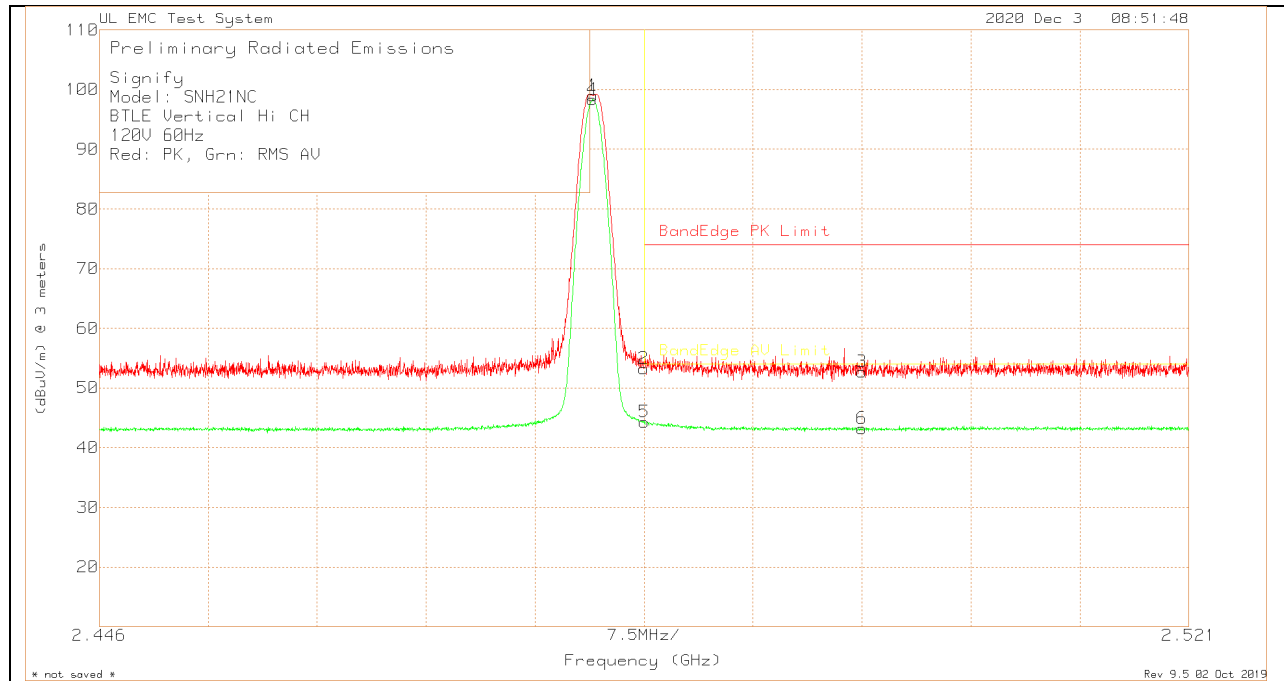
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Signify														
Model: SNH21NC														
BTLE Horizontal Hi CH														
120V 60Hz														
Red: PK, Grn: RMS AV														
Trace Markers														
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	DC Correct ion 100% dB	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.48	75.31	Pk	22	0	4.5	101.81	-	-	-	-	336	153	H
2	2.4835	28.7	Pk	22.1	0	4.51	55.31	74	-18.69	-	-	336	153	H
3	2.501	25.47	Pk	22.1	0	4.5	52.07	74	-21.93	-	-	336	153	H
4	2.48	74.59	RMS AV	22	0	4.5	101.09	-	-	-	-	336	153	H
5	2.4835	18.47	RMS AV	22.1	0	4.51	45.08	-	-	54	-8.92	336	153	H
6	2.5011	16.66	RMS AV	22.1	0	4.5	43.26	-	-	54	-10.74	336	153	H
Pk - Peak detector														
RMS AV - RMS Average Measurement														

VERTICAL RESULT



Signify														
Model: SNH21NC														
BTLE Vertical Hi CH														
120V 60Hz														
Red: PK, Grn: RMS AV														
Trace Markers														
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor dB/m	DC Correct ion 100% dB	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degr]	Height [cm]	Polarity	
1	2.48	72.49	Pk	22	0	4.5	98.99	-	-	-	227	309	V	
2	2.4835	26.61	Pk	22.1	0	4.51	53.22	74	-20.78	-	227	309	V	
3	2.4985	26.12	Pk	22.1	0	4.49	52.71	74	-21.29	-	227	309	V	
4	2.48	71.79	RMS AV	22	0	4.5	98.29	-	-	-	227	309	V	
5	2.4835	17.74	RMS AV	22.1	0	4.51	44.35	-	-	54	-9.65	227	309	V
6	2.4985	16.59	RMS AV	22.1	0	4.49	43.18	-	-	54	-10.82	227	309	V
Pk - Peak detector														
RMS AV - RMS Average Measurement														

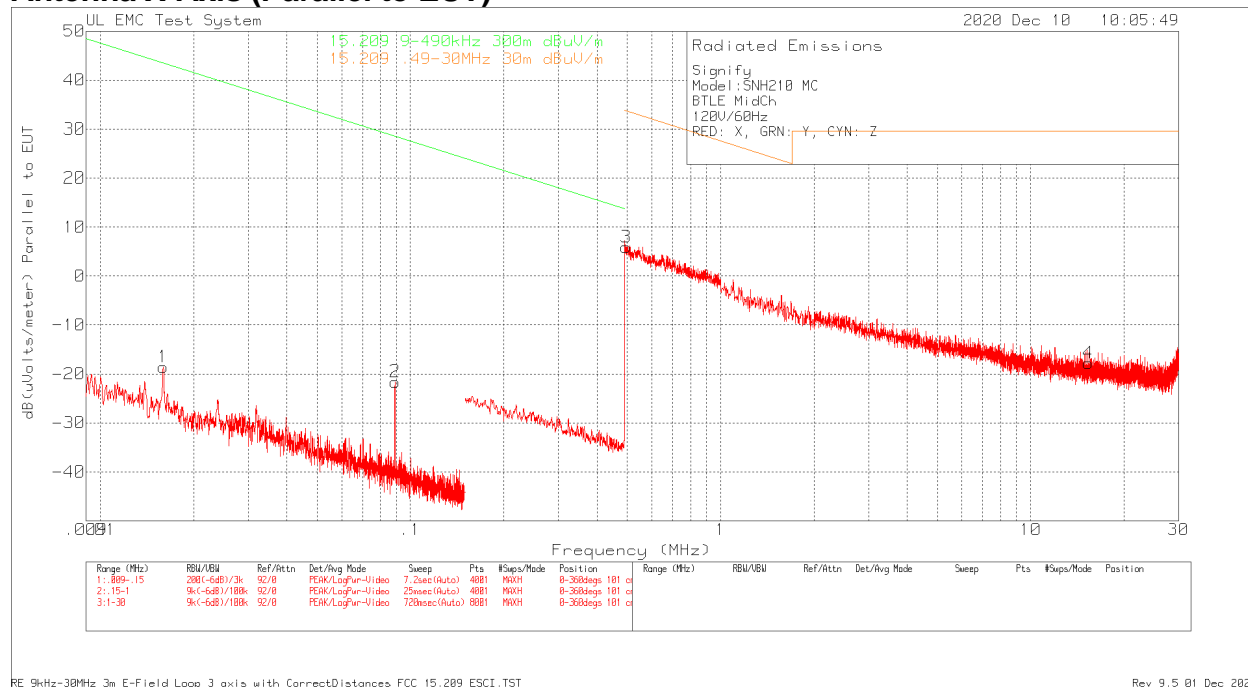
HARMONICS AND SPURIOUS EMISSIONS

9kHz – 30MHz Middle Channel (worst case)

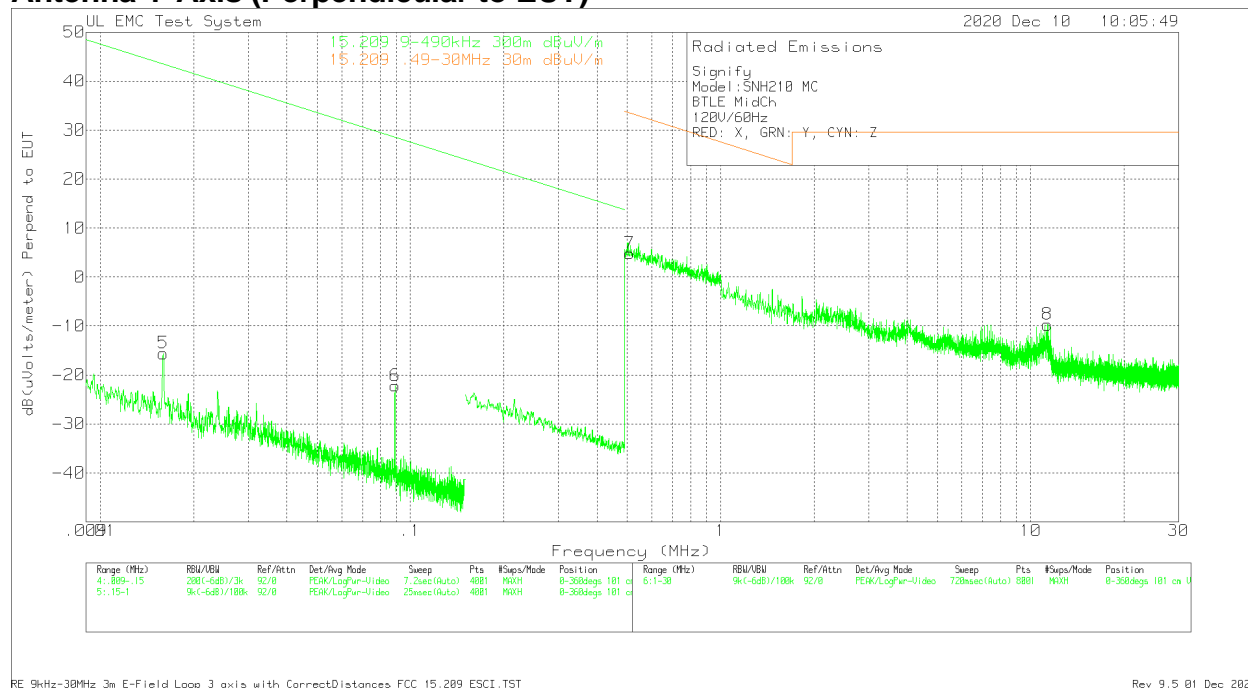
Note for below 30 MHz scans: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log(\text{test distance} / \text{specification distance})$.

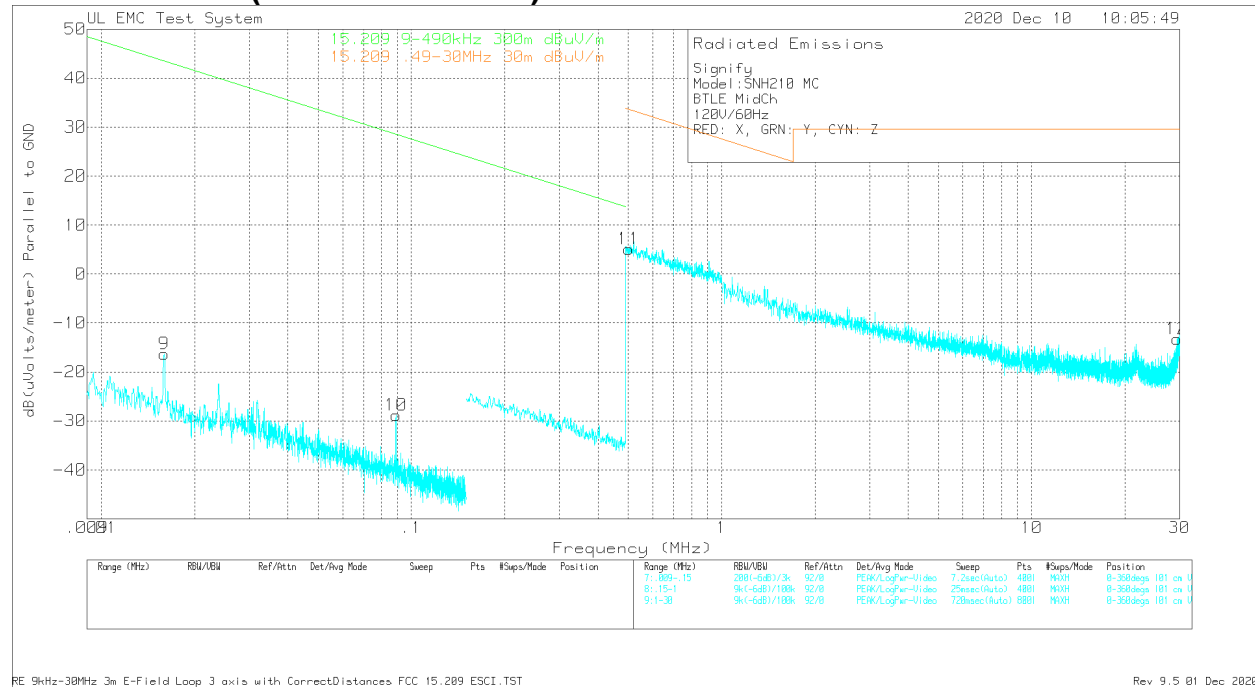
The below 30 MHz limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency 15.93 KHz resulted in a level of -18.63 dBuV/m, which is equivalent to $-18.63 - 51.5 = -70.13$ dBuA/m, which has the same margin, -62.18 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Antenna X-Axis (Parallel to EUT)



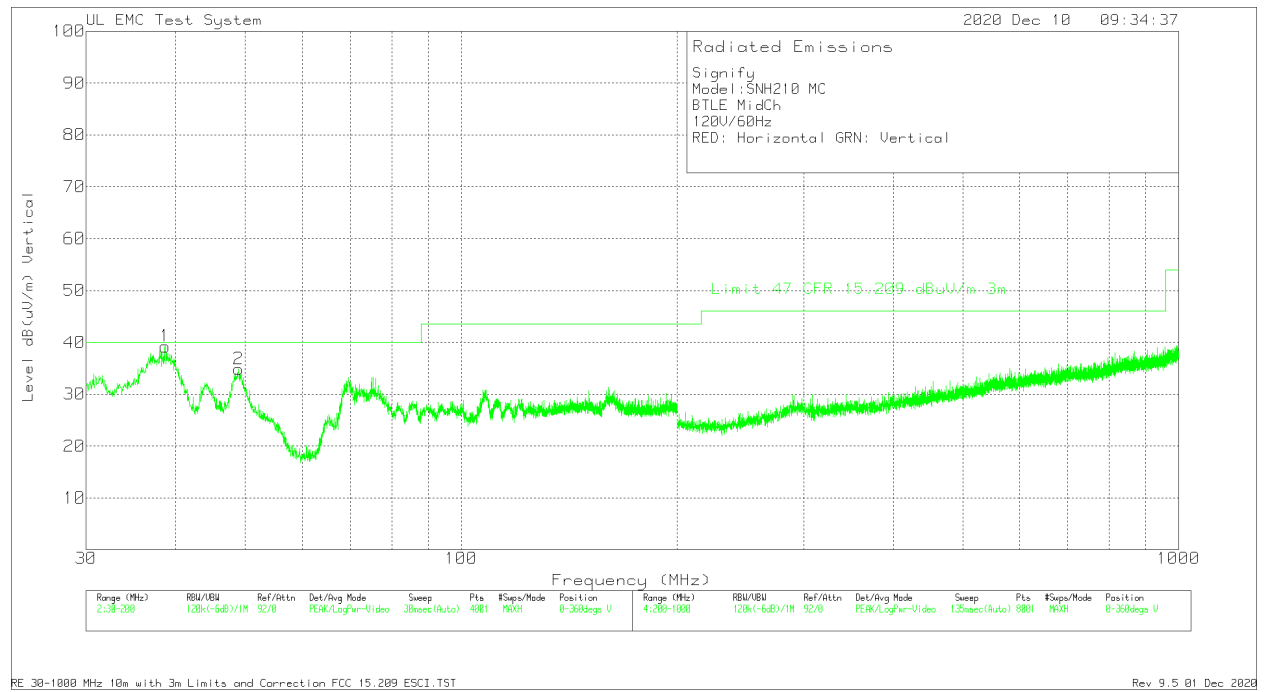
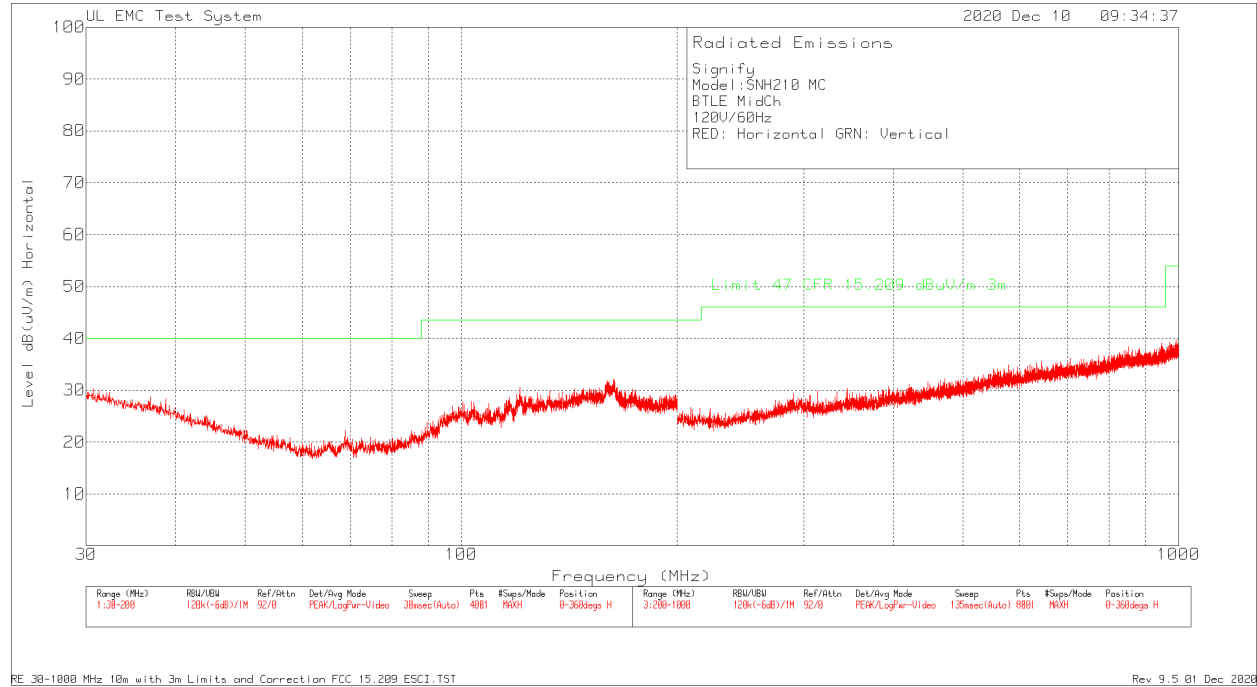
Antenna Y-Axis (Perpendicular to EUT)





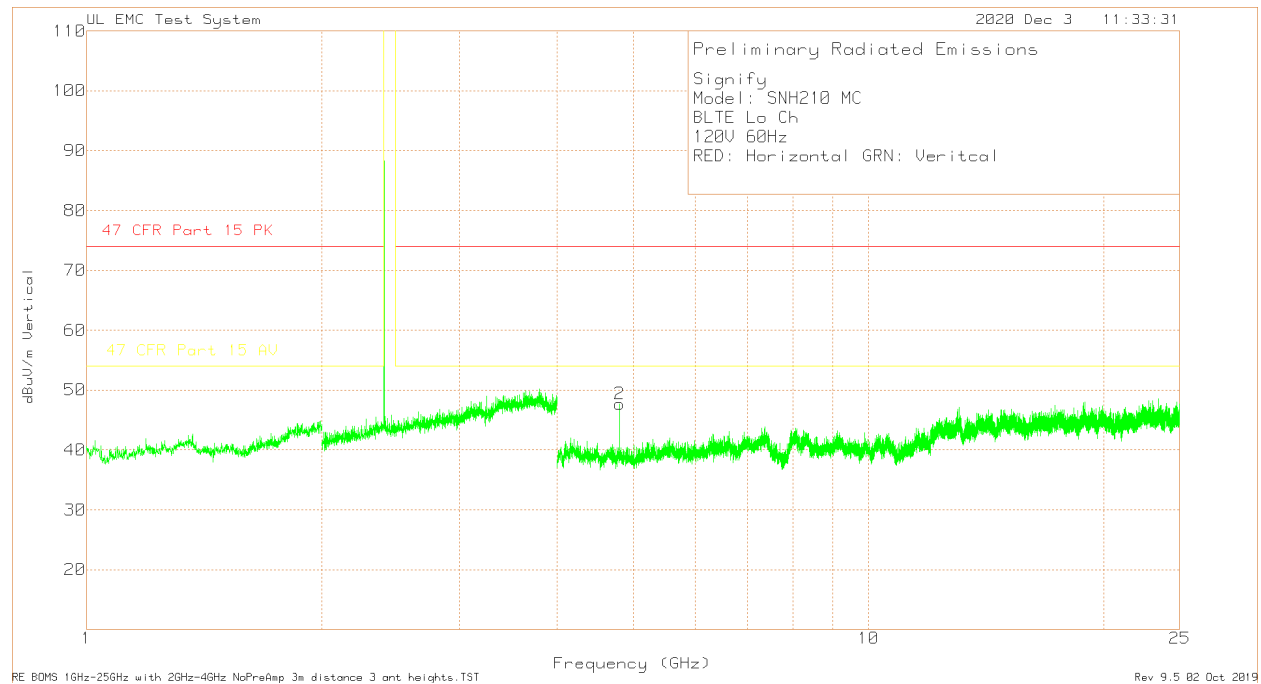
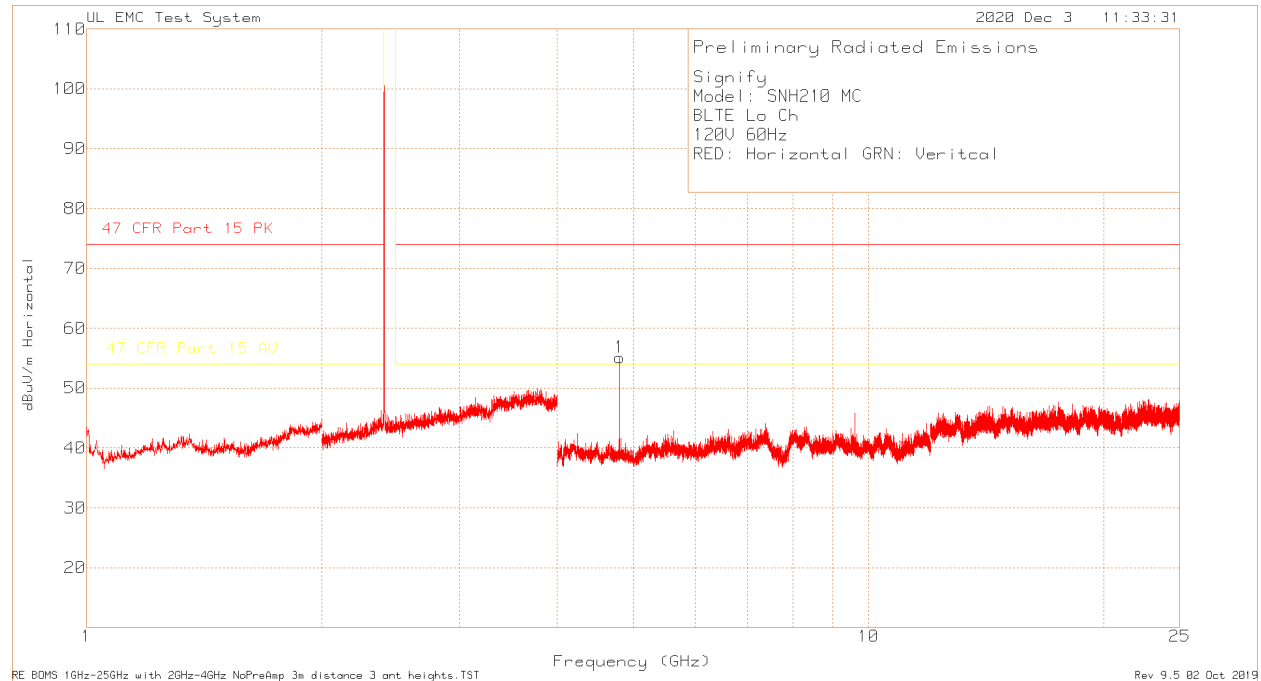
Signify												
Model:SNH210 MC												
BTLE MidCh												
120V/60Hz												
RED: X, GRN: Y, CYN: Z												
Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	300mTo3m & 30mTo3m dB	Level dBuV/m	15.209 9-490kHz 300m dBuV/m	Margin (dB)	15.209 .49-30MHz 30m dBuV/m	Margin (dB)	Azimuth [Deps]
Parallel to EUT												
1	0.01593	40.37	Pk	20.9	0.1	-80	-18.63	43.55	-62.18	-	-	0-360
2	0.08915	45.48	Pk	12.8	0.1	-80	-21.62	28.6	-50.22	-	-	0-360
3	0.49613	33.98	Pk	11.8	0.1	-40	5.88	-	-	33.69	-27.81	0-360
4	15.35138	10.56	Pk	11.2	0.4	-40	-17.84	-	-	29.54	-47.38	0-360
Perpendicular to EUT												
5	0.01593	43.4	Pk	20.9	0.1	-80	-15.6	43.55	-59.15	-	-	0-360
6	0.08915	44.9	Pk	12.8	0.1	-80	-22.2	28.6	-50.8	-	-	0-360
7	0.50891	32.91	Pk	11.8	0.1	-40	4.81	-	-	33.47	-28.66	0-360
8	11.32038	18.26	Pk	11.6	0.4	-40	-9.74	-	-	29.54	-39.28	0-360
Parallel to Ground												
9	0.01593	42.69	Pk	20.9	0.1	-80	-16.31	43.55	-59.86	-	-	0-360
10	0.08915	38.23	Pk	12.8	0.1	-80	-28.87	28.6	-57.47	-	-	0-360
11	0.5023	33.18	Pk	11.8	0.1	-40	5.08	-	-	33.58	-28.5	0-360
12	29.40913	16.89	Pk	9.3	0.5	-40	-13.31	-	-	29.54	-42.85	0-360
Pk - Peak detector												

30MHz – 1GHz Middle Channel



Signify													
Model:SNH210 MC													
BTLE MidCh													
120V/60Hz													
RED: Horizontal GRN: Vertical													
Trace MArkers													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10m to 3m factor dB	Level @ 3m dBuV/m	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	
1	38.67	44.3	Pk	14.5	-30.1	10.5	39.2	40	-0.8	0-360	98	V	
2	48.955	44.43	Pk	10	-30.1	10.5	34.83	40	-5.17	0-360	247	V	
Radiated Emission Data													
	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10m to 3m factor dB	Level @ 3m dBuV/m	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	
	38.67	37.81	Qp	14.5	-30.1	10.5	32.71	40	-7.29	114	153	V	
	48.9125	38.46	Qp	10	-30.1	10.5	28.86	40	-11.14	350	101	V	
Pk - Peak detector													
Qp - Quasi-Peak detector													

1GHz – 25GHz Low Channel



Signify

Model: SNH210 MC

BLTE Lo Ch

120V 60Hz

RED: Horizontal GRN: Vertical

Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	4.804	77.96	Pk	27.7	-50.58	55.08	74	-18.92	-	-	0-360	180	H
2	4.804	70.6	Pk	27.7	-50.58	47.72	74	-26.28	-	-	0-360	171	V

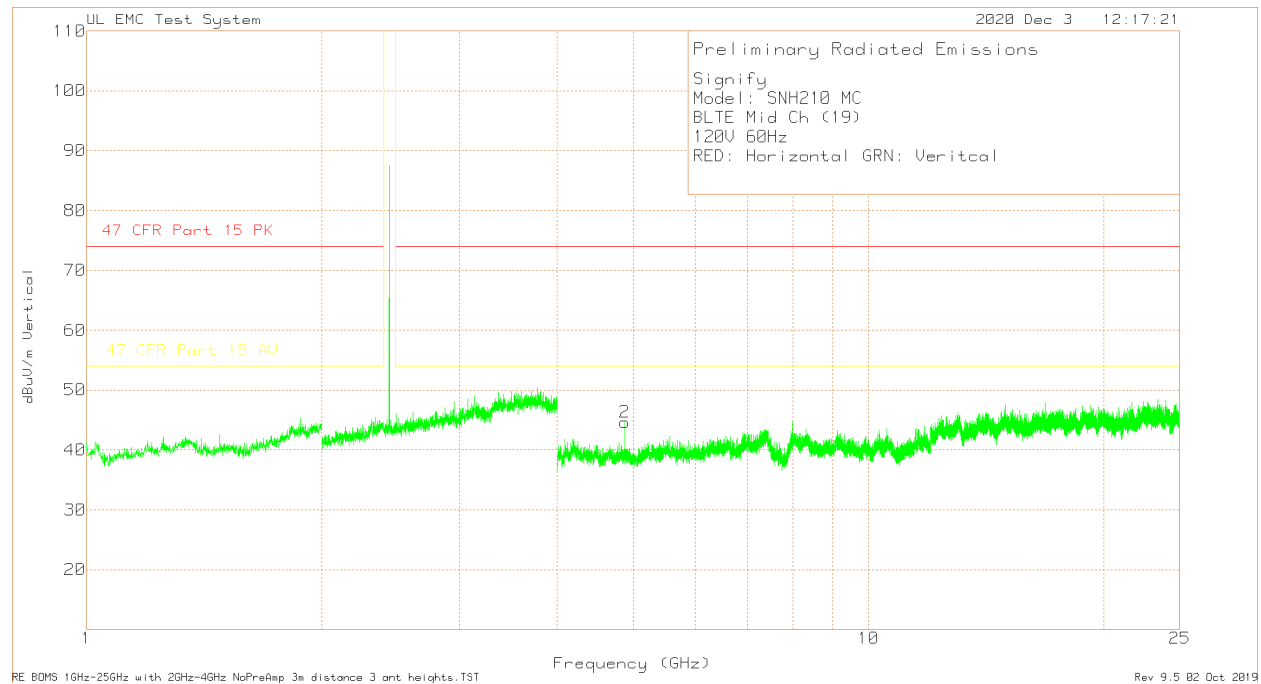
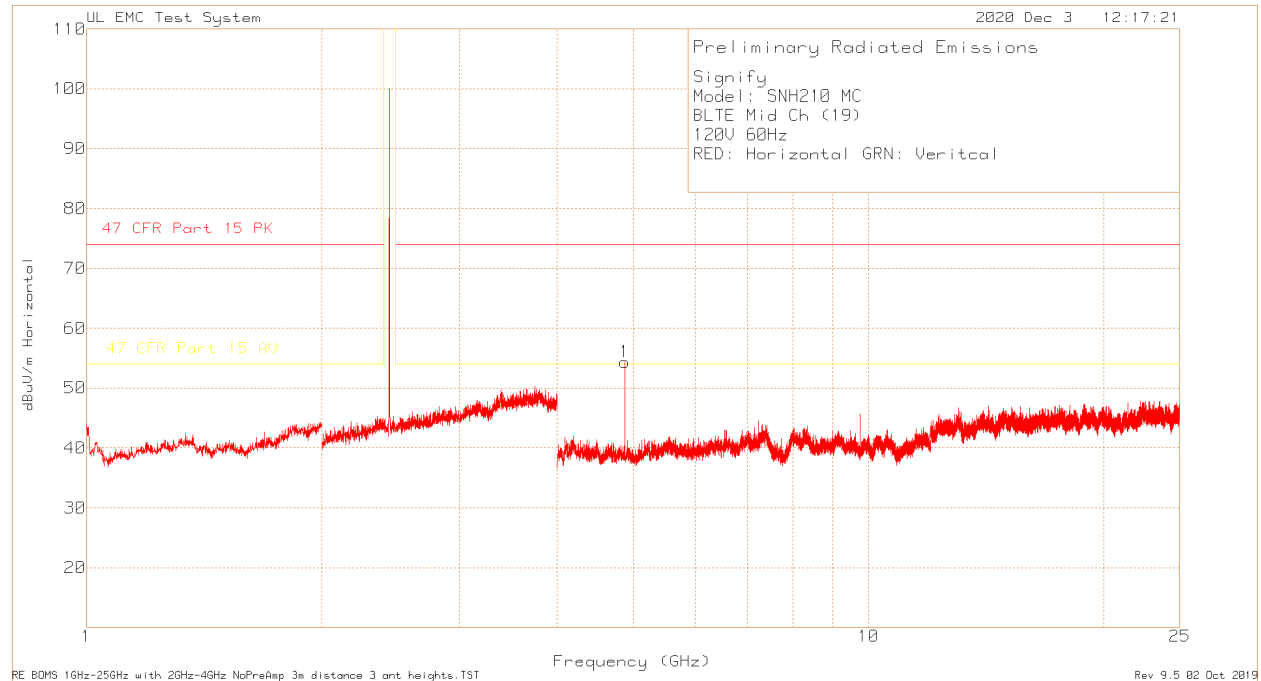
Radiated Emission Data

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4.8035	78.49	Pk	27.7	-50.75	55.44	74	-18.56	-	-	28	179	H
4.8043	74.37	RMS AV	27.7	-50.63	51.44	-	-	54	-2.56	28	179	H

Pk - Peak detector

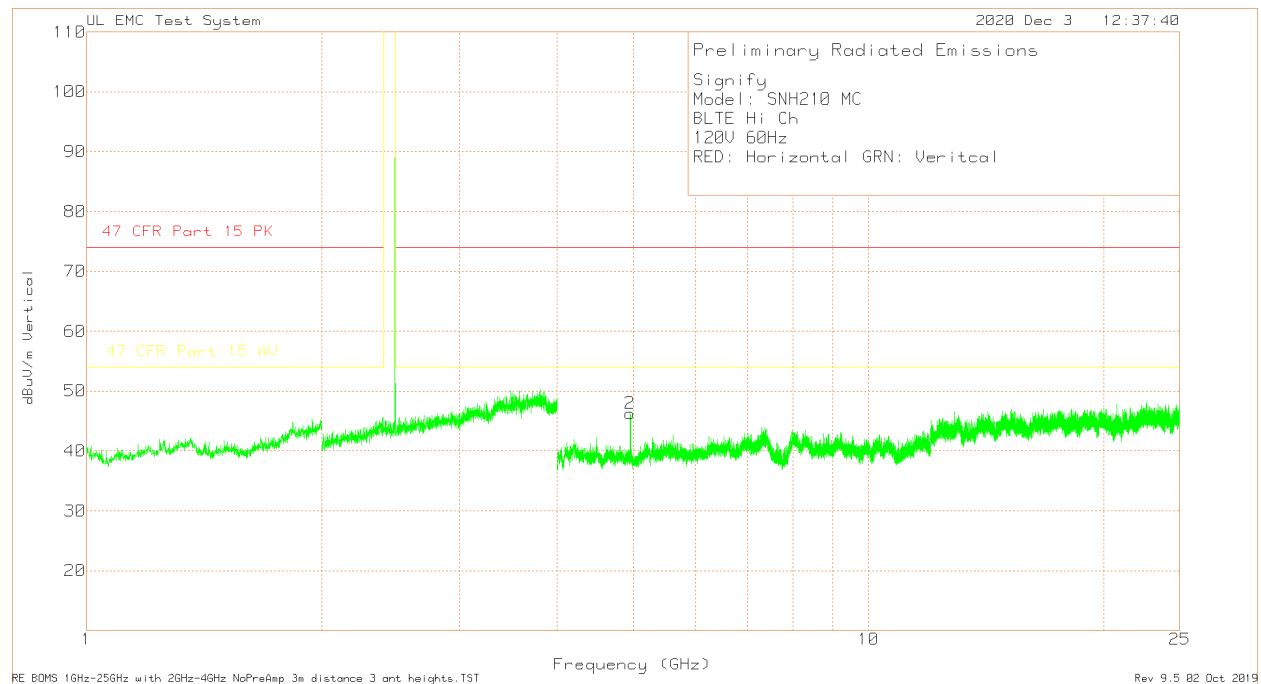
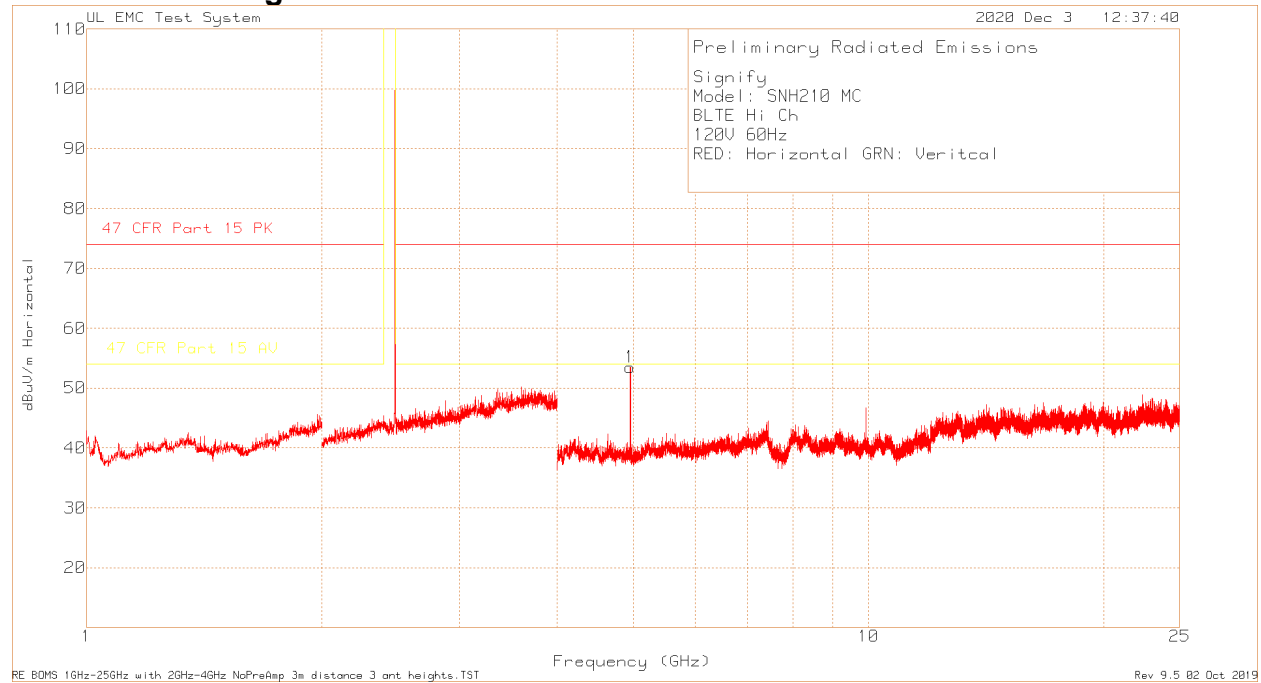
RMS AV - RMS Average Measurement

1GHz – 25GHz Middle Channel



Signify													
Model: SNH210 MC													
BLTE Mid Ch (19)													
120V 60Hz													
RED: Horizontal GRN: Veritcal													
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	4.881	76.36	Pk	27.7	-49.73	54.33	74	-19.67	-	-	0-360	179	H
2	4.881	66.63	Pk	27.7	-49.73	44.6	74	-29.4	-	-	0-360	170	V
Radiated Emission Data													
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	4.8805	77.14	Pk	27.7	-49.86	54.98	74	-19.02	-	-	41	149	H
	4.8798	73.13	RMS AV	27.7	-49.94	50.89	-	-	54	-3.11	41	149	H
Pk - Peak detector													
RMS AV - RMS Average Measurement													

1GHz – 25GHz High Channel



Signify													
Model: SNH210 MC													
BLTE Hi Ch													
120V 60Hz													
RED: Horizontal GRN: Vertical													
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	4.96	75.08	Pk	27.8	-49.37	53.51	74	-20.49	-	-	0-360	149	H
2	4.96	67.83	Pk	27.8	-49.37	46.26	74	-27.74	-	-	0-360	140	V
Radiated Emission Data													
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level @ 3m dBuV/m	Limit 47 CFR Part 15 PK dBuV/m	Margin (dB)	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	4.9605	75.1	Pk	27.8	-49.22	53.68	74	-20.32	-	-	52	149	H
	4.9602	71.01	RMS AV	27.8	-49.31	49.5	-	-	54	-4.5	52	149	H
Pk - Peak detector													
RMS AV - RMS Average Measurement													

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

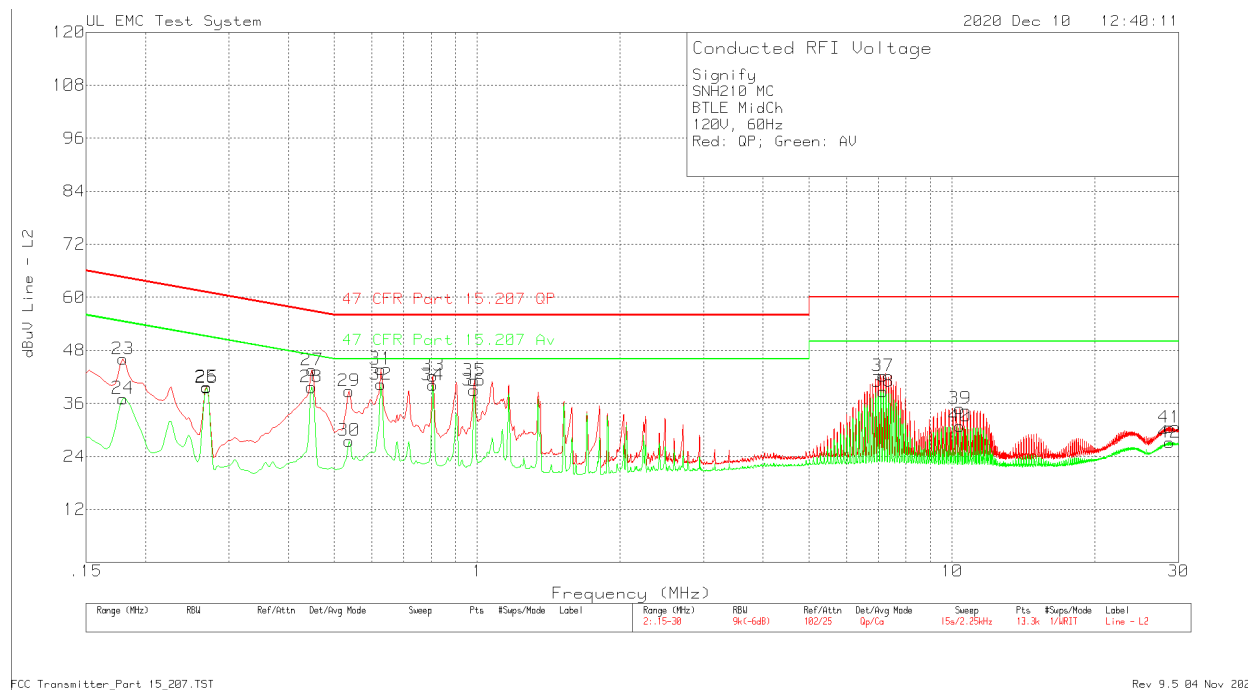
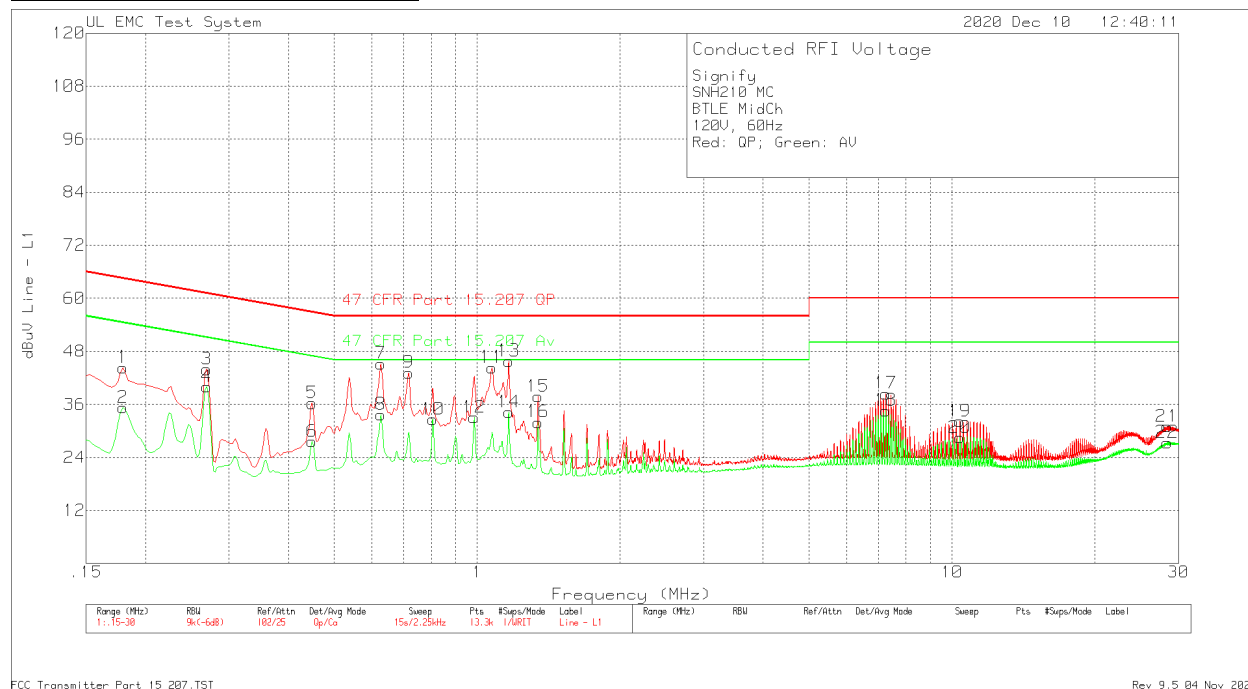
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

Line Conducted Emissions Data



Signify											
SNH210 MC											
BTLE MidCh											
120V, 60Hz											
Red: QP; Green: AV											
Trace Markers											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor dB	Level dBuV	47 CFR Part 15.207 QP dBuV	Margin (dB)	47 CFR Part 15.207 Av dBuV	Margin (dB)	
Line 1 - Line											
1	0.17925	32.43	Qp	0	11.9	44.33	64.52	-20.19	-	-	
2	0.17925	23.36	Ca	0	11.9	35.26	-	-	54.52	-19.26	
3	0.26925	32.92	Qp	0	11	43.92	61.14	-17.22	-	-	
4	0.26925	29.01	Ca	0	11	40.01	-	-	51.14	-11.13	
5	0.44925	25.66	Qp	0	10.6	36.26	56.89	-20.63	-	-	
6	0.44925	17.03	Ca	0	10.6	27.63	-	-	46.89	-19.26	
7	0.627	34.74	Qp	0	10.5	45.24	56	-10.76	-	-	
8	0.627	23.2	Ca	0	10.5	33.7	-	-	46	-12.3	
9	0.717	32.67	Qp	0	10.5	43.17	56	-12.83	-	-	
10	0.807	22.11	Ca	0	10.5	32.61	-	-	46	-13.39	
11	1.0725	33.83	Qp	0	10.5	44.33	56	-11.67	-	-	
12	0.98475	22.59	Ca	0	10.5	33.09	-	-	46	-12.91	
13	1.16475	35.31	Qp	0	10.5	45.81	56	-10.19	-	-	
14	1.16475	23.72	Ca	0	10.5	34.22	-	-	46	-11.78	
15	1.3425	27.25	Qp	0	10.5	37.75	56	-18.25	-	-	
16	1.3425	21.46	Ca	0	10.5	31.96	-	-	46	-14.04	
17	7.25325	27.65	Qp	0	10.8	38.45	60	-21.55	-	-	
18	7.251	23.8	Ca	0	10.8	34.6	-	-	50	-15.4	
19	10.38525	21.15	Qp	0	11	32.15	60	-27.85	-	-	
20	10.38525	17.53	Ca	0	11	28.53	-	-	50	-21.47	
21	28.392	19.29	Qp	-0.1	11.8	30.99	60	-29.01	-	-	
22	28.38638	15.68	Ca	-0.1	11.8	27.38	-	-	50	-22.62	
Line 2 - Neutral											
23	0.17925	34.15	Qp	0	11.9	46.05	64.52	-18.47	-	-	
24	0.17925	25.21	Ca	0	11.9	37.11	-	-	54.52	-17.41	
25	0.26925	28.73	Qp	0	11	39.73	61.14	-21.41	-	-	
26	0.26925	28.55	Ca	0	11	39.55	-	-	51.14	-11.59	
27	0.44925	32.9	Qp	0	10.6	43.5	56.89	-13.39	-	-	
28	0.447	29.05	Ca	0	10.6	39.65	-	-	46.93	-7.28	
29	0.537	28.16	Qp	0	10.6	38.76	56	-17.24	-	-	
30	0.537	16.94	Ca	0	10.6	27.54	-	-	46	-18.46	
31	0.627	33.24	Qp	0	10.5	43.74	56	-12.26	-	-	
32	0.627	29.76	Ca	0	10.5	40.26	-	-	46	-5.74	
33	0.807	31.79	Qp	0	10.5	42.29	56	-13.71	-	-	
34	0.807	29.66	Ca	0	10.5	40.16	-	-	46	-5.84	
35	0.98475	30.71	Qp	0	10.5	41.21	56	-14.79	-	-	
36	0.98475	28.47	Ca	0	10.5	38.97	-	-	46	-7.03	
37	7.15875	31.41	Qp	0	10.8	42.21	60	-17.79	-	-	
38	7.161	27.84	Ca	0	10.8	38.64	-	-	50	-11.36	
39	10.3875	23.8	Qp	0	11	34.8	60	-25.2	-	-	
40	10.3875	19.89	Ca	0	11	30.89	-	-	50	-19.11	
41	28.725	18.76	Qp	-0.1	11.9	30.56	60	-29.44	-	-	
42	28.725	15.39	Ca	-0.1	11.9	27.19	-	-	50	-22.81	
Qp - Quasi-Peak detector											
Ca - CISPR Average detection											