NOKIA Bell Labs

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TESTING
NVLAP LAB CODE: 100275-0

Title 47 Code of Federal Regulations Test Report

Regulation:
FCC Part 2 and 15E

Client:
Nokia Mobile Networks, OY

Product Evaluated:
AirScale Micro RRH 2T Band 46 LAA UNII 1/2/3 (AZRB)
4 Carriers (Non-DFS)

Report Number:
TR2018-0157-FCC2-15E RF Non-DFS

Date Issued:
September 17, 2019

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Revisions

Date	Revision	Section	Change
9/17/2019	0		Initial Release

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Prepared By:

Signed: _____ 9/17/2019

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Approved By:

Signed: _____ 9/17/2019

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Reviewed By:

Signed: _____ 9/17/2019

Steve Gordon
Compliance Engineer

1. System Information and Requirements

Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in Murray-Hill, NJ.

Equipment Under Test (EUT):	AirScale Micro RRH 2T Band 46 LAA (AZRB) 4C
FCC ID:	2AD8UAZRBRH1
Serial Number:	1M181320011, 1M181319967 (Radiated), 1M181319962 (Conducted)
Hardware Version:	474510A.101
Software Version:	FL18A
Frequency Range:	5170-5250 MHz (UNII-1); 5250-5350 MHz (UNII-2a); 5470-5725 MHz (UNII-2c); 5735-5835 MHz (UNII-3) E-UTRAN Band 46
Type of Equipment:	Intentional Transceiver
GPCL Project File Number:	2018-0157 & 2019-0025 & 2019-0002
Applicant & Manufacturer:	Nokia Solutions and Networks, OY 2000 W. Lucent Lane Naperville, IL 60563 USA
Test Requirement(s):	Title 47 CFR Parts 2 and 15E (Non-DFS)
Test Standards:	• Title 47 CFR Parts 2 and 15E • KDB 789033 D02, General U-NII Test Procedures New Rules, v02r01, December 2017 • KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013 • ANSI C63.10 (2013)
Measurement Procedure(s):	• FCC-IC-OB - GPCL Power Measurement, Occupied Bandwidth & Modulation Test Procedure 6-20-2019 • FCC-IC-SE - GPCL Spurious Emissions Test Procedure 6-20-2019
Test Date(s):	July 2018/June 2019
Type of Application	C2PC
Test Performed By:	Nokia Global Product Compliance Laboratory 600-700 Mountain Ave. P.O. Box 636 Murray Hill, NJ 07974-0636
Product Engineer(s):	Jeff Webb
Lead Engineer:	Qin Yu
Test Engineer (s):	Norman Albrecht, Jaideep Yadav, Greg Manuel, Mike Soli
Test Results: The AirScale RRH 2T B46 UNII-1/2/3 (AZRB) 4C, as tested met the above listed requirements. Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in New Providence, NJ.	

1.1 Introduction

This Conformity test report applies to the AirScale Micro RRH 2T B46 UNII-1/2/3 (AZRB) 4C, hereinafter referred to as the Equipment Under Test (EUT).

1.2 Purpose and Scope

The purpose of this document is to provide the non-DFS testing data required for qualifying the EUT with the 4x20MHz carrier for the existing 7 antennas in compliance with FCC Parts 2 and 15E requirements measured in accordance with the procedures set out in Section 2.1033 (c) (14) of the Rules. The testing data required for qualifying the EUT equipped with the two new antennas BAAIO3O3T3T3VJX65F-06 and PAS2457-CC1 and the 1x20MHz-4x20MHz carrier configurations were demonstrated in the TR-2019-0082-FCC2-15E RF Non-DFS r1 and TR2019-0025-FCC2-15E RF DFS reports.

AirScale RRH 2T, B46, 1W, is a low power RRH for small cell deployment. It has been FCC certified under FCC ID: 2AD8UAZRBRH1 in UNII-1/2/3 bands for 1x20MHz, 2x20MHz and 3x20MHz carriers with the following antennas:

Data of Approved UNII Antennas from Manufacturers

Ant No	Model Name	Antenna Type/ Size (mm)	Frequency (MHz)	Tx/Rx Port	Max Gain (dBi)	
					Port 1	Port 2
1	AARC	Directional 295(L) × 270(W) × 30(D)	5150 ~ 5850	Tx/Rx 1/2	4.9	4.9
2	FA2RC	Directional 160(L) × 110(W) × 44(D)	5150 ~ 5850	Tx/Rx 1/2	6.0	6.0
3	VVSSP-360S-F	Omni-Directional 600(L) × 100(R)	5150 ~ 5925	Tx/Rx 1/2	5.1	5.1
4	GQ2410-06645	Omni-Directional 634(L) × 127.5(R)	5150 ~ 5925	Tx/Rx 1/2	5.9	5.9
5	2205	Directional 198(W) × 24.5(D) × 198(H)	5150 ~ 5925	Tx/Rx 1/2	9.5	9.5
6	GO4806-06664	Omni-Directional, 1219(L) × 52(D)	5150 ~ 5925	Tx/Rx 1/2	6.0	6.0
7	FA2RA	Omni-Directional , 235(L) × 51(D)	5150 ~ 5850	Tx/Rx 1/2	7.5	7.5

UNII-1/2/3 Antennas Tested In the Previous Filings (with the Highest Gain of Each Type)

Antenna No	Model Name	Antenna Type	Frequency (MHz)	Max Gain (dBi)		Notes
				Port 1	Port 2	
4	GQ2410-06645	Omni-Directional	5150 ~ 5925	5.9	5.9	Original Filing
5	2205	Directional	5150 ~ 5925	9.5	9.5	
6	GO4806-06664	Omni-Directional	5150 ~ 5925	6.0	6.0	C2PC
7	FA2RA	Omni-Directional	5150 ~ 5850	7.5	7.5	C2PC

Antenna Gains in UNII-1 Band
in Elevation Angles 30° above the Horizontal Plane for Outdoor EUT

Antenna No	Model	Antenna Type	Max Gain in Elevation Angle 30° above Horizont (dBi)
1	AARC	Directional	-9.1
2	FA2RC	Directional	-7.0
3	VVSSP-360S-F	Omni-Directional	-9.5
4	GQ2410-06645	Omni-Directional	-11.0
5	2205	Directional	-7.0
6	GO4806-06664	Omni-Directional	-9.0
7	FA2RC	Omni-Directional	-8.0

Per 2.1043(b)(2), when a Class II permissive change is made by the grantee, the grantee shall provide complete information and the results of tests of the characteristics affected by such change. This test is to evaluate the configuration with 4x20MHz carriers, where the 26dB emission bandwidth and the radiated unwanted emissions are impacted and required to be evaluated. The maximum output power with 4C configuration needs to be verified. The tests in this report were performed for UNII Devices Operating in the UNII-1/2/3 Bands in accordance with the requirements of FCC CFR 47 Part 15 Subpart E. Testing with the GO4806-06664, 2205, and FA2RA antenna was performed to demonstrate worst case results for the different types of antenna, and to qualify all seven of the previously approved antenna for 4x20MHz mode of operation.

1.3 EUT Details

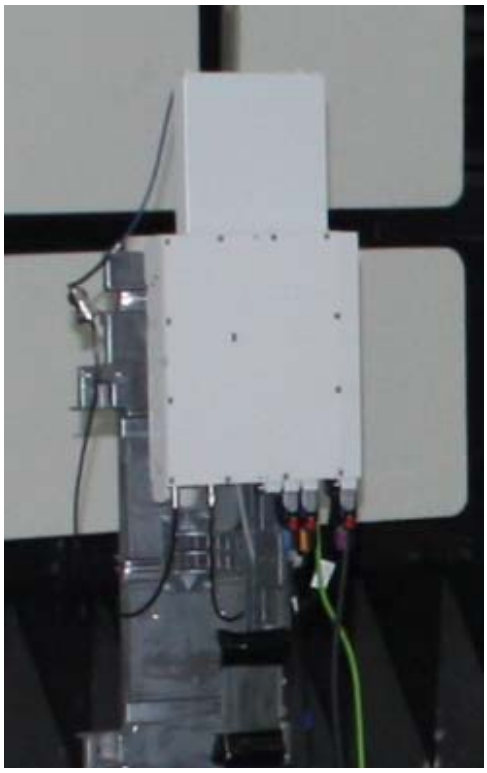
1.3.1 Specifications

Specification Items	Description	
Radio Access Technology	LAA LTE-TDD	
Operation Mode	Master Device, Point to Multipoint	
Modulation Type(s)	QPSK, 16QAM, 64QAM, 256QAM	
Operation Frequency Range	E-UTRAN Band 46: 5170-5250 MHz (UNII-1); 5250-5350 MHz (UNII-2a); 5470-5725 MHz (UNII-2c); 5735-5835 MHz (UNII-3)	
Tx and Rx Signal Bandwidths	5/10/15/20MHz	
Number of Tx and Rx Paths	2TX/2RX	
MIMO	Yes	
Max Conducted RF Power	5170-5250 MHz (UNII-1)	Antennas with Max Gain ≤ 6 dBi*: 26dBm per port and 29dBm total Antennas with Max Gain = 9.5 dBi: 22.5 dBm per port and 25.5dBm total
	5250-5350 MHz & 5470-5725 MHz (UNII-2)	Antennas with Max Gain ≤ 6 dBi: 1x20MHz: 19.5dBm per port and 22.5dBm total nx20MHz: 21dBm per port and 24dBm total Antennas with Max Gain =7.5 dBi: 1x20MHz: 18dBm per port and 21dBm total nx20MHz: 19.5dBm per port and 22.5dBm total Antennas with Max Gain =9.5 dBi:

		1x20MHz: 16dBm per port and 19dBm total nx20MHz: 17.5dBm per port and 20.5dBm total	
	5735-5835 MHz (UNII-3)	Antennas with Max Gain ≤ 6 dBi: (1-3)x20MHz, 27dBm per port and 30dBm total 4x20MHz, 26dBm per port and 29dBm total Antennas with Max Gain ≤ 7.5 dBi: (1-3)x20MHz, 25.5dBm per port and 28.5dBm total 4x20MHz, 24.5dBm per port and 27.5dBm total Antennas with Max Gain = 9.5 dBi: (1-3)x20MHz, 23.5dBm per port and 26.5dBm total 4x20MHz, 22.5dBm per port and 25.5dBm total	
Max Rated EIRP Power	5170-5250 MHz (UNII-1)	32dBm per port and 35dBm total	
	5250-5350 MHz & 5470-5725 MHz (UNII-2)	1x20MHz: 28.5dBm nx20MHz: 30dBm	
	5735-5835 MHz (UNII-3)	(1-3)x20MHz: 33dBm per port and 36dBm total 4x20MHz: 32dBm per port and 35dBm total	
Max OD EIRP at any Elevation Angle above 30° from Horizon	5170-5250 MHz (UNII-1)	≤ 125mW (21 dBm) Outdoor	
Min Conducted Power	50mW (17dBm) per port and 100mW (20dBm) total		
Maxi. Number of Carriers per Port	4		
Maxi. Spacing between Carriers in Number of Carriers	N/A		
Deployment Environment	Outdoor		
Environment Temperature Range	-40 °C to +55 °C		
Power Source	DC: -38V to -57V		
	AC (via external AC converter)		
	Minimum	Nominal	Maximum
	80.0	110.0	276.0
Antenna	Refer to Section 1.2. No beamforming		

*Maximum gain of Antenna #7 FA2RA in UNII-1 band is 6dBi.

1.3.2 Photographs



1.4 Test Requirements

Each required measurement is listed below:

47 CFR FCC Sections	Description of Tests	Test Required
15.407 (a)(1-4)	Maximum Power Output	Yes
15.403(i), 15.215(c), 15.407(a)(2) (5)	Emission Bandwidth (26dB Bandwidth)	Yes
15.407 (b)(1-5)(7-8), 15.205 & 15.209	Unwanted Radiated Out-of-Band Emissions	Yes
15.407 (b)(1-8), 15.205 & 15.209	Unwanted Radiated Spurious Emissions	Yes

1.5 Standards & Procedures

1.5.1 Standards

- Title 47 Code of Federal Regulations, Federal Communications Commission Part 2.
- Title 47 Code of Federal Regulations, Federal Communications Commission Part 15.

1.5.2 Procedures

1. GPCL FCC-IC-0B and FCC-IC-SE

2. ANSI C63.10 (2013) entitled: "American Nation Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices", American National Standards Institute, Institute of Electrical and Electronic Engineers, Inc., New York, NY 10017-2394, USA.

3. FCC KDB 789033 D02, General U-NII Test Procedures New Rules, v02r01, December 2017.

4. FCC KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013

1.5.3 Measurement Uncertainty

The results of the calculations to estimate uncertainties for the several test methods and standards are shown in the Table below. These are the worst-case values.

Worst-Case Estimated Measurement Uncertainties

Standard, Method or Procedure	Condition	Frequency MHz	Expanded Uncertainty (k=2)
a. Classical Emissions, (*e.g.,* ANSI C63.4, CISPR 11, 14, 22, *etc.*, using ESHS 30,	Conducted Emissions	0.009 - 30	±3.5 dB
	Radiated Emissions (AR-9 Semi-Anechoic Chamber)	30 MHz – 200MHz H 30 MHz – 200 MHz V 200 MHz – 1000 MHz H 200 MHz – 1000 MHz V	±5.4 dB ±5.4 dB ±4.7 dB ±4.7 dB
		1 GHz - 18 GHz	±3.3 dB

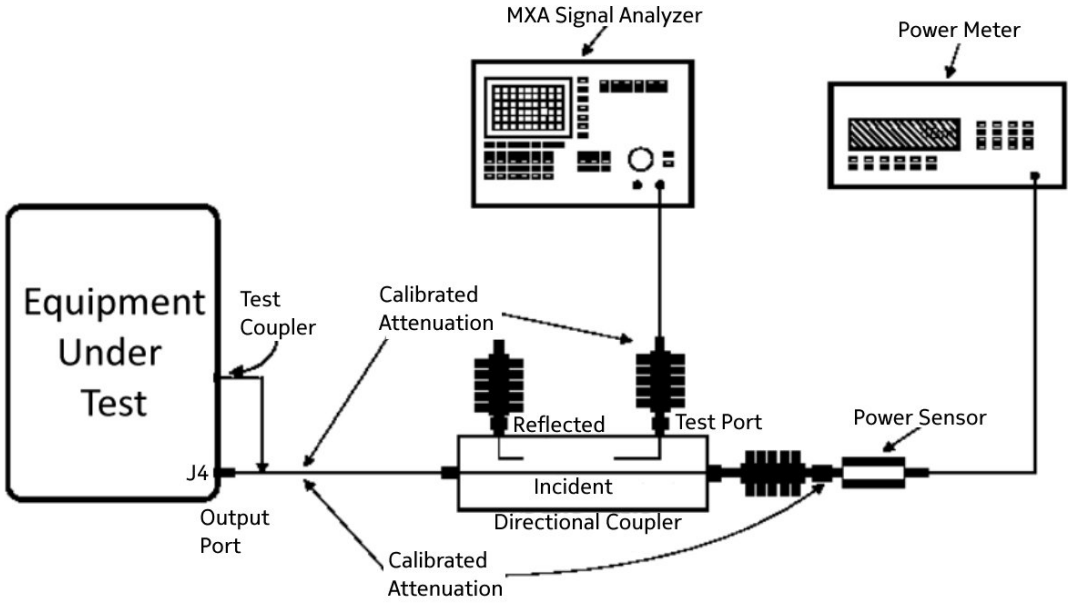
Antenna Port Test	Signal Bandwidth	Frequency Range	Expanded Uncertainty (k=2), Amplitude
Occupied Bandwidth, Edge of Band, Conducted Spurious Emissions	10 Hz 100 Hz 10 kHz to 1 MHz 1MHz	9 kHz to 20 MHz 20 MHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 40 GHz:	2.8 dB
RF Power	10 Hz to 20 MHz	50 MHz to 18 GHz	1.4 dB

1.6 Executive Summary

Requirement	Description	Result
47 CFR FCC Parts 2 and 15E		
15.407 (a)(1-4)	Maximum Power Output	COMPLIES
15.215(c),15.403(i) & 15.407(a)(2) (5)	Emission Bandwidth (26dB Bandwidth)	COMPLIES
15.407 (b)(1-5)(7-8), 15.205 & 15.209	Unwanted Radiated Out-of-Band Emissions	COMPLIES
15.407 (b)(1-8), 15.205 & 15.209	Unwanted Radiated Spurious Emissions	COMPLIES

1. **COMPLIES -** Passed all applicable tests.
2. **N/A –** Not Applicable.
3. **NT –** Not Tested.

1.7 Test Configuration for all Antenna Port Measurements



1.8 Test Channels

UNII-2 (5250-5350MHz, 5470-5725MHz) 4C Frequency Channel Plan

Bands	Channel No (Nch)	Freq (MHz)	Channel BW	Freq Bands
UNII-1 (B46a)	36, 40, 44, 48	5180, 5200, 5220, 5240	80MHz	5170-5250
UNII-2a (B46b)	52, 56, 60, 64	5260, 5280, 5300, 5320	80MHz	5250-5350
UNII-2c (B46c)	100, 104, 108, 112	5500, 5520, 5540, 5560	80MHz	5470-5725
	132, 136, 140, 144	5660, 5680, 5700, 5720		
UNII-3	149, 153, 157, 161	5745, 5765, 5785, 5805	80MHz	5735 -5835
	153, 157, 161, 165	5765, 5785, 5805, 5825		

2. FCC Section 15.407 (a)(1-4) - RF Power Output

2.1 RF Power Output

This test is a measurement of the total RF power level transmitted at the antenna-transmitting terminals at the selected channels for *verification purpose*. The product was configured for test as shown in section above and allowed to warm up and stabilize per KDB 789033 D02 and ANSI C63.10.

Maximum Transmitter Power at Antenna Ports Previously Approved

Band	Antenna	Max Directional Gain for Total Power (dBi)	Total Maximum Power Allowed at Ant Port (dBm)
UNII-1	#5	9.5	25.5
UNII-2	#5	9.5	20.5
UNII-3	#5	9.5	26.5
UNII-1	#6	6.0	29.0
UNII-2	#6	6.0	24.0
UNII-3	#6	6.0	30.0
UNII-1	#7	6.0	29.0
UNII-2	#7	7.5	22.5
UNII-3	#7	7.5	28.5

Power measurements were made with an MXA Signal Analyzer. The maximum power for 4x20MHz configuration at antenna ports is 26dBm per port. The maximum power levels for 4x20MHz with 6dBi antenna were verified below, where the maximum power for 4x20MHz is 26dBm per port:

Maximum Mean RF Power Output for 4x20 MHz Carriers UNII-1/3 6dBi Ant #6 (26dBm per Port)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	Power (dBm) Port 1	Power (dBm) Port 2	Total Power (dBm)	Limit (dBm)	Results
UNII-1 (5.17-5.25)	36, 40, 44, 48/5180, 5200, 5220, 5240	Q/16QAM	25.76	25.75	28.8	29	Pass
UNII-3 (5735 -5835)	149, 153, 157, 161/ 5745, 5765, 5785, 5805	Q/16QAM	25.97	25.90	28.95	30	Pass
	153, 157, 161, 165/ 5765, 5785, 5805, 5825	Q/16QAM	25.88	25.93	28.92	30	Pass

Maximum Mean RF Power Output for 4x20 MHz Carriers UNII-2 6dBi Ant #6 (21dBm)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	Power (dBm) Port 1	Total Power (dBm)	Limit (dBm)	Results
UNII-2a (5250-5350)	52, 56, 60, 64/5260, 5280, 5300, 5320	Q/16QAM	20.82	23.82	24	Pass
UNII-2c (5470-5725)	100, 104, 108, 112/ 5500, 5520, 5540, 5560	Q/16QAM	20.91	23.91	24	Pass
	116, 120, 124, 128/ 5580, 5600, 5620, 5640	Q/16QAM	20.99	23.99	24	Pass
	128, 132, 136, 140/5640, 5660, 5680, 5700	Q/16QAM	20.85	23.85	24	Pass

Maximum Mean RF Power Output for 4x20 MHz Carriers UNII-1/3 9.5dBi Ant #5 (22.5dBm per Port)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	Power (dBm) Port 1	Power (dBm) Port 2	Total Power (dBm)	Limit (dBm)	Results
UNII-1 (5.17-5.25)	36, 40, 44, 48/5180, 5200, 5220, 5240	Q/16QAM	22.44	22.42	25.44	25.5	Pass
UNII-3 (5735 -5835)	149, 153, 157, 161/ 5745, 5765, 5785, 5805	Q/16QAM	22.42	22.50	25.47	26.5	Pass
	153, 157, 161, 165/ 5765, 5785, 5805, 5825	Q/16QAM	22.46	22.48	25.48	26.5	Pass

Maximum Mean RF Power Output for 4x20 MHz Carriers UNII-2 9.5dBi Ant #5 (17.5dBm Per Port)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	Power (dBm) Port 1	Total Power (dBm)	Limit (dBm)	Results
UNII-2a (5250-5350)	52, 56, 60, 64/5260, 5280, 5300, 5320	Q/16QAM	17.36	20.36	20.5	Pass
UNII-2c (5470-5725)	100, 104, 108, 112/ 5500, 5520, 5540, 5560	Q/16QAM	17.42	20.42	20.5	Pass
	116, 120, 124, 128/ 5580, 5600, 5620, 5640	Q/16QAM	17.25	20.25	20.5	Pass
	128, 132, 136, 140/5640, 5660, 5680, 5700	Q/16QAM	17.43	20.43	20.5	Pass

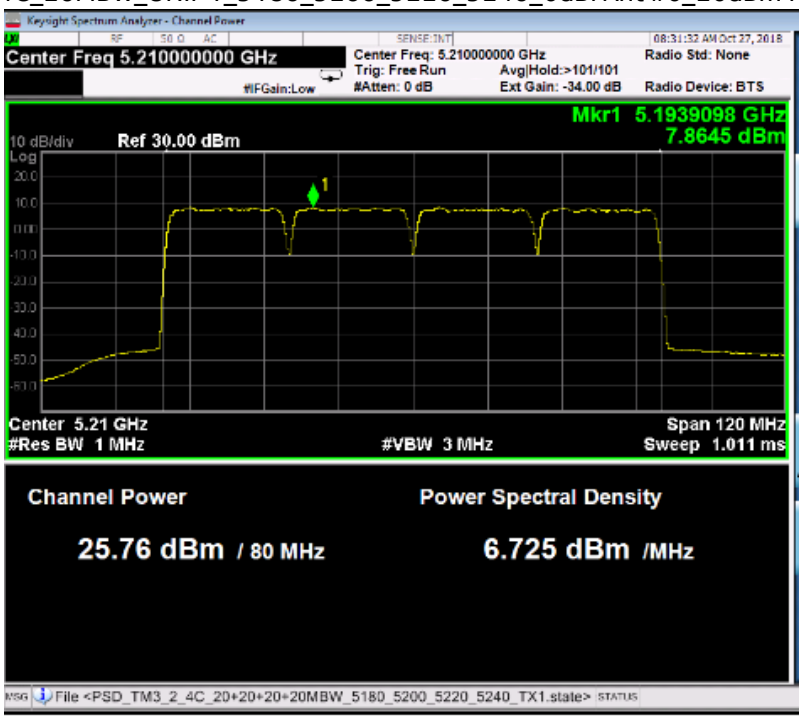
Maximum Mean RF Power Output for 4x20 MHz Carriers UNII-2 7.5dBi Ant #7 (19.5dBm Per Port)

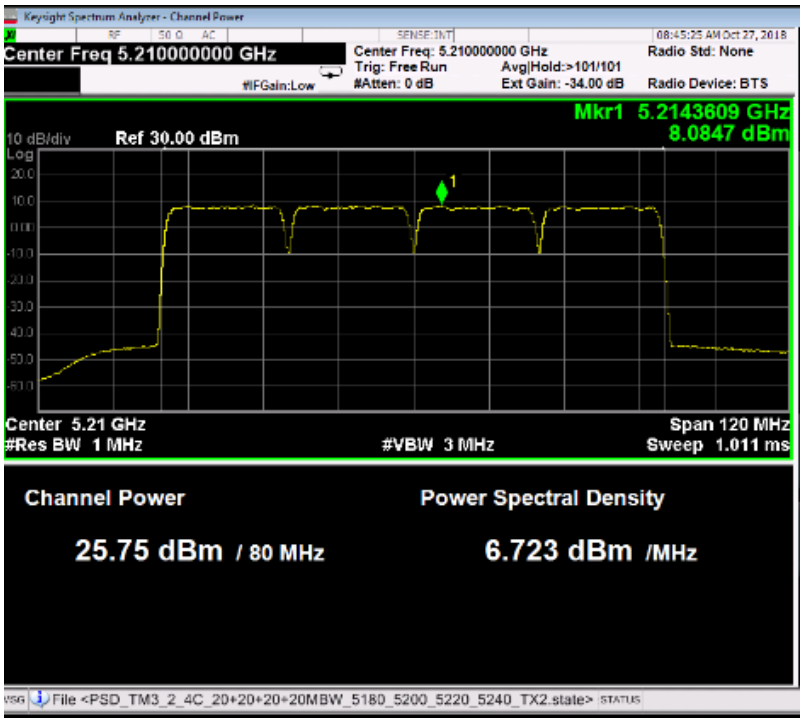
Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	Power (dBm) Port 1	Total Power (dBm)	Limit (dBm)	Results
UNII-2a (5250-5350)	52, 56, 60, 64/5260, 5280, 5300, 5320	Q/16QAM	19.35	22.35	22.5	Pass
UNII-2c (5470-5725)	100, 104, 108, 112/ 5500, 5520, 5540, 5560	Q/16QAM	19.44	22.44	22.5	Pass
	116, 120, 124, 128/ 5580, 5600, 5620, 5640	Q/16QAM	19.50	22.50	22.5	Pass
	128, 132, 136, 140/5640, 5660, 5680, 5700	Q/16QAM	19.34	22.34	22.5	Pass

2.1.1 Channel RF Power – Plots

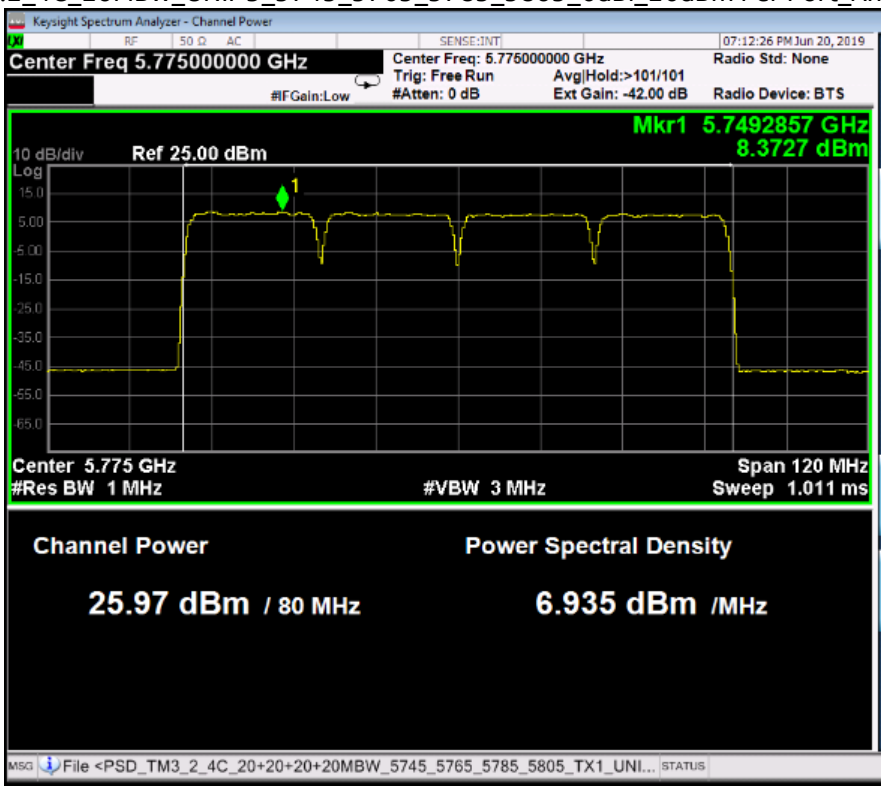
NOTE: Only a sample of the plots for Ant #6 with the maximum power in each UNII band are used in this report. The full suite of raw data resides at the MH, New Jersey location.

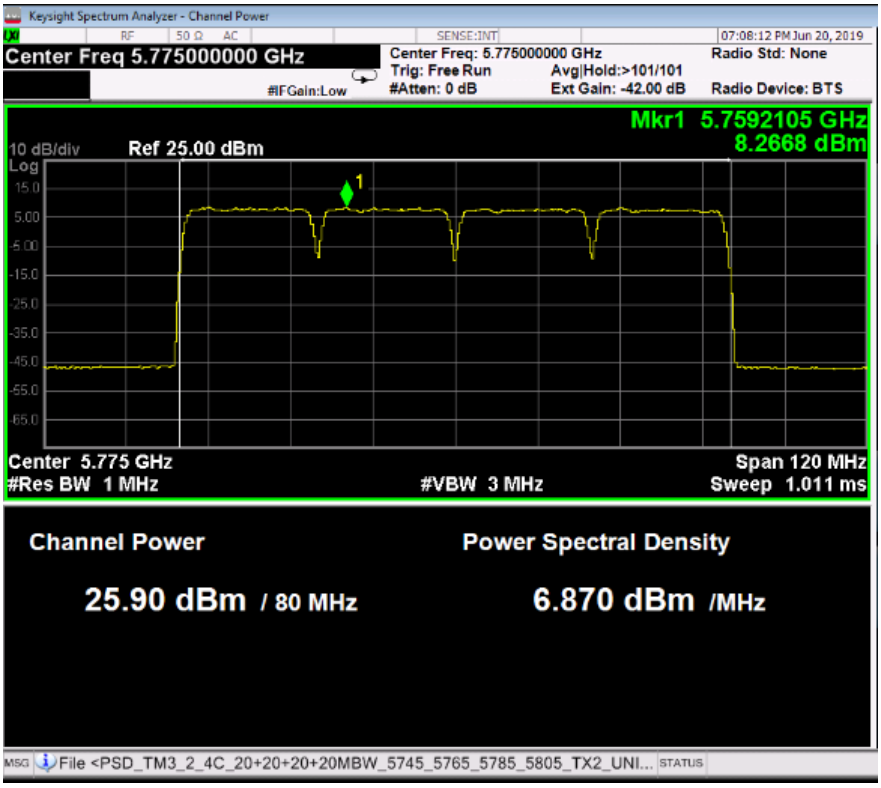
Ch_Power_TM3.2_4C_20MBW_UNII-1_5180_5200_5220_5240_6dBi Ant #6_26dBm Per Port_TX1 & TX2



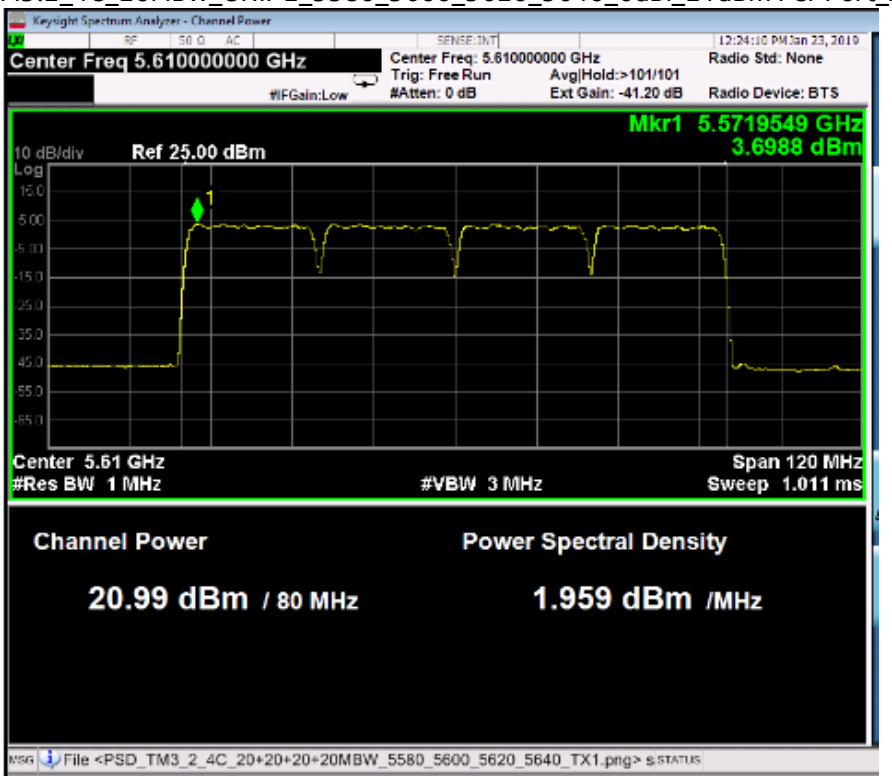


Ch_Power_TM3.2_4C_20MBW_UNII-3_5745_5765_5785_5805_6dBi_26dBm Per Port_Ant #6_TX1 & TX2





Ch_Power_TM3.2_4C_20MBW_UNII-2_5580_5600_5620_5640_6dBi_21dBm Per Port_Ant #6_TX1



3. FCC Section 15.215(c),15.403(i) &15.407(a)(2) (5) – Emission Bandwidth

3.1 Emission Bandwidth

This test is a measurement of the 26dB emission at the antenna-transmitting terminals.

FCC Section 15.215(c) stated that in the case of intentional radiators operating under the provisions of Subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

FCC Section 15.403 (i) stated that the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

KDB 789033D02 III.B stated that per 15.215(c), any transmission that does not intentionally extend into the 5.25−5.35 GHz band must be down 26 dB above 5.25 GHz and the 99% bandwidth may be used in lieu of the 26dB bandwidth. The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The measurement follows the procedures given in KDB 789033 D02 and ANSI C63.10. The automatic bandwidth measurement function of the spectrum analyzer was utilized where the resolution bandwidth (RBW) is initially set to 1% of the bandwidth and the video bandwidth (VBW), that is 800kHz for 80MHz, the video bandwidth was set to 1MHz, and the peak detector with maximum hold and auto sweep was used. Then the maximum width of the emission that is 26 dB down from the maximum of the emission was measure and compared with the RBW setting of the analyzer. The RBW might be readjusted as needed until the RBW/EBW ration is approximately 1%.

The maximum allowable conducted power levels were used for this measurement.

Bandwidth Measurement for 4x20 MHz Carriers UNII-1 (26dBm/port)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	99% OBW (MHz)
UNII-1 (5.17-5.25)	36, 40, 44, 48/ 5180, 5200, 5220, 5240	Q/16QAM	77.60
		64QAM	77.46
		256QAM	77.45

Bandwidth Measurement for 4x20 MHz Carriers UNII-2 (21dBm/port)

Bands (GHz)	Ch No/ Carrier Freq (MHz)	Modulation	99% OBW (MHz)
UNII-2a (5250-5350)	52, 56, 60, 64/ 5260, 5280, 5300, 5320	Q/16QAM	77.549
		256QAM	77.425
UNII-2c (5470-5725)	116, 120, 124, 128/ 5580, 5600, 5620, 5640	Q/16QAM	77.484
	116, 120, 124, 128/ 5580, 5600, 5620, 5640	256QAM	77.476

Bandwidth Measurement for 4x20MHz Carriers UNII-3 (26dBm/port)

Bands (GHz)	Ch No/ Freq (MHz)	Modulation	99% OBW (MHz)
UNII-3 (5.74-5.835)	149, 153, 157, 161/ 5745, 5765, 5785, 5805	Q/16QAM	77.55
		64QAM	77.41
		256QAM	77.46
	153, 157, 161, 165/ 5765, 5785, 5805, 5825	Q/16QAM	77.49
		64QAM	77.41
		256QAM	77.43

Maximum 99% Bandwidth Measured

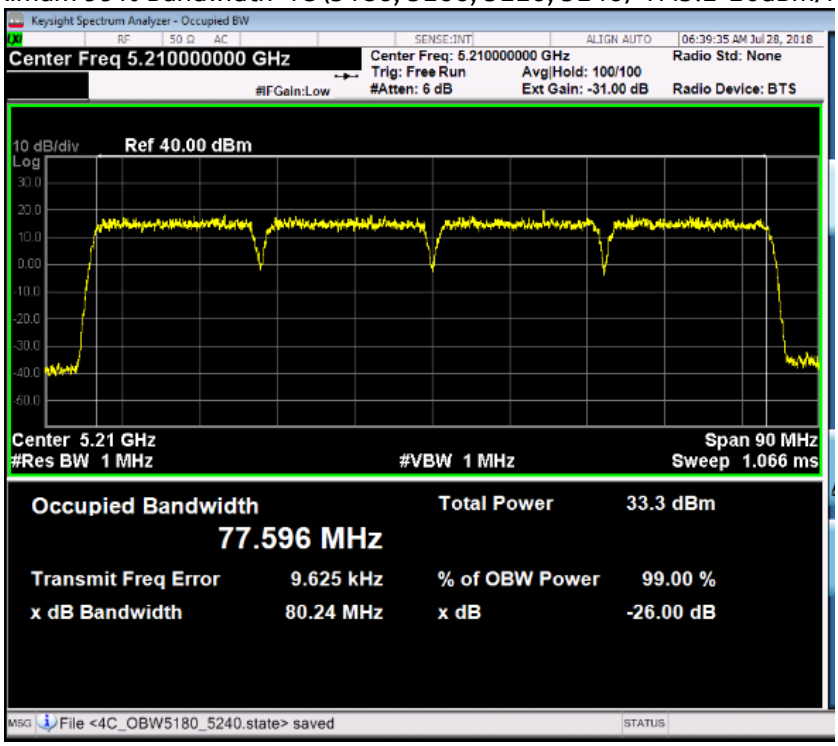
Bands (GHz)	Bandwidth (MHz)	Max 99% BW (MHz)	Test Results
UNII-1	4 x 20MHz	77.60	Pass
UNII-2	4 x 20MHz	77.55	Pass
UNII-3	4 x 20MHz	77.55	Pass

The 99% bandwidths measured are all less than their nominal bandwidths. Therefore, the 99% occupied bandwidth is all within the specified frequency band and met the requirements of FCC Section 15.215(c) and KDB 789033D02 III.B for devices operating in the 5.15−5.25 GHz band.

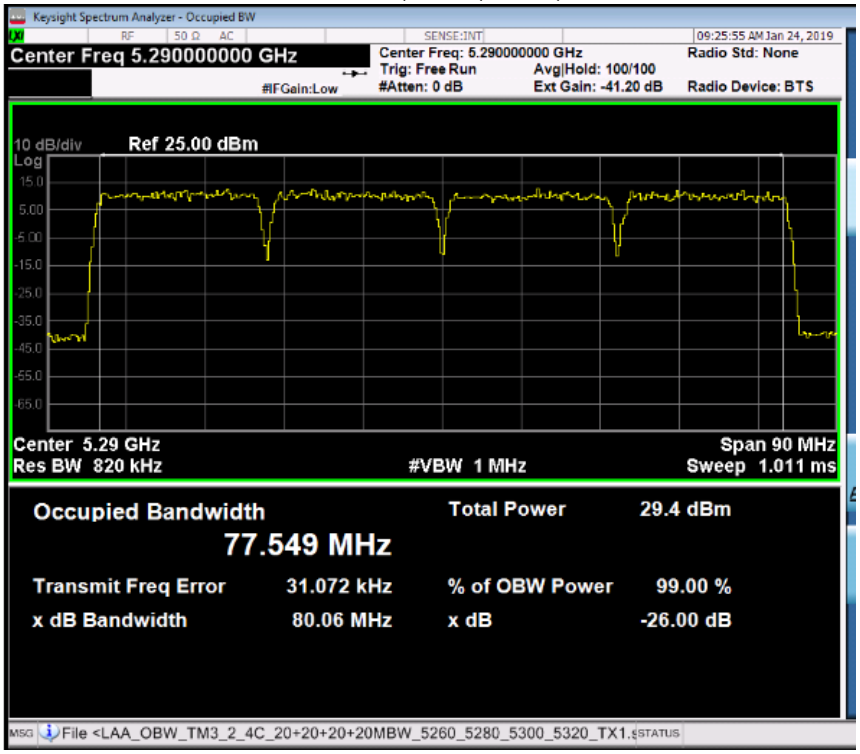
The plots of the maximum 99% bandwidths of the EUT measured at its antenna transmitting terminals in the UNII-1/2/3 bands are provided below. The results and measurements are in full compliance with the Rules of the Commission.

3.1.1 Emission Bandwidth – Plots

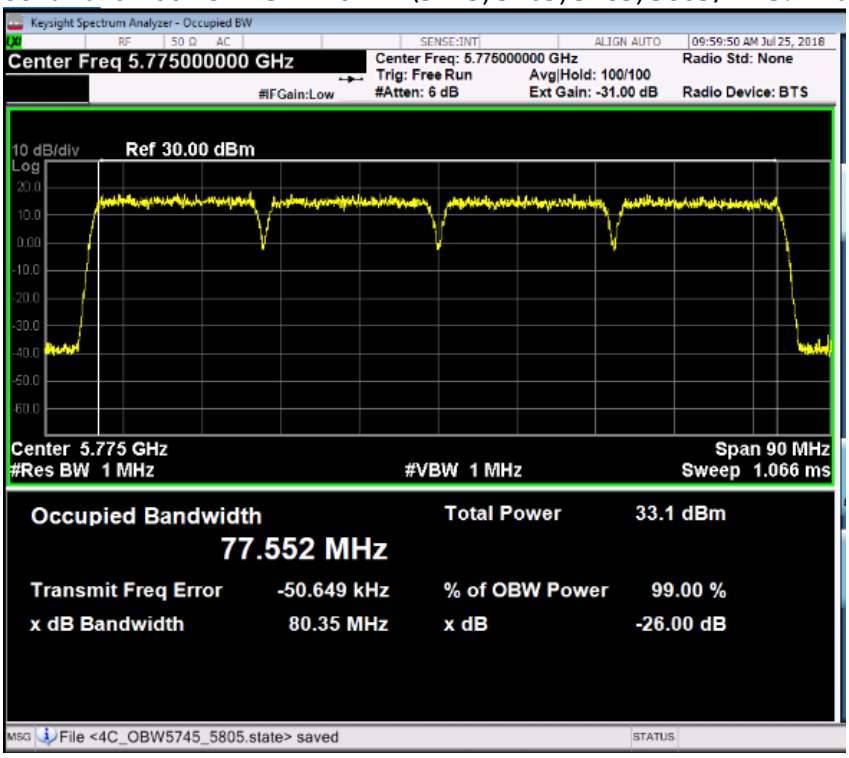
Maximum 99% Bandwidth-4C (5180, 5200, 5220, 5240)-TM3.2-26dBm/Port



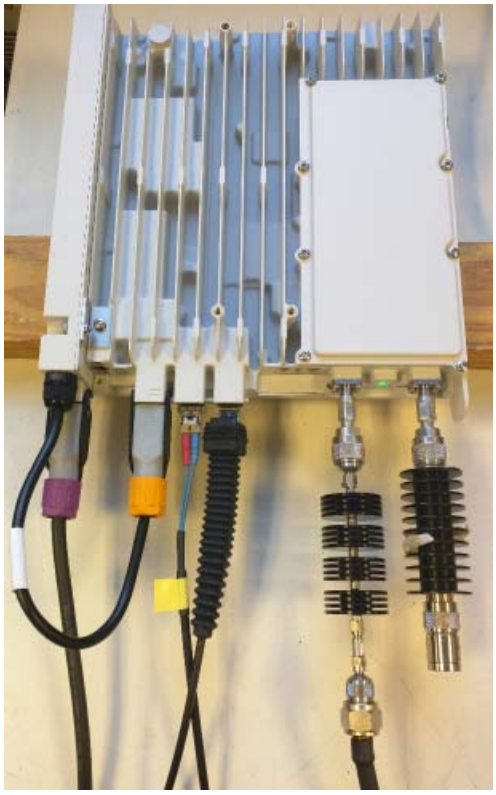
Maximum 99% Bandwidth-4C (5260, 5280, 5300, 5320)-TM3.2-21dBm/Port



Maximum 99% Bandwidth-UNII-3-4x20MHz (5745, 5765, 5785, 5805)-TM3.2-26dBm/Port



Photographs



Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Last Calibration Date	Calibration Due	Calibration Type
E1152	Agilent Technologies	MXA Signal Analyzer	20Hz-26.5GHz Analyzer	N9020A	MY53420147	2019-04-24	2021-04-24	Requires Calibration
E1360	Fairview Microwave	Attenuator	10 dB, DC - 40 GHz, 20 watt	SA4023-10	N/A			Calibration Not Required, Must Be Verified
E1344	Macom	Attenuator	3 dB, DC - 4 GHz, 2 watt	2082-6171-03	N/A			Calibration Not Required, Must Be Verified
E1349	Weinschel	Attenuator	20 dB, DC - 18 GHz, 2 watt	4M-20	E7390			Calibration Not Required, Must Be Verified
E896	Agilent Technologies	Network Analyzer	10 MHz - 40 GHz	N5230C	MY49000897	2019-01-31	2021-01-31	Requires Calibration

4. FCC Section 15.407(b) (1-5)(7-8) - Unwanted Radiated Out-of-Band Emissions

4.1 Out of Band Emissions

This test measures the out-of-band emissions, the unwanted emissions outside the band, but near the band edges.

The radiated out of band emissions of the EUT per 15.33 were measured. The recommendations of ANSI C63.10 were followed for the EUT testing setup and cabling. The emissions were maximized by rotating the turntable 360° and moving the receiving antenna height to scan and capture the emissions from the EUT.

4.2 Out of Band Emissions Limits

Per FCC 15.407(b)(1-5), the unwanted emission limits are:

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz shall not exceed an EIRP of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209.

(7) The field strength of emissions appearing *within Section 15.205 restricted frequency bands* shall not exceed the limits shown in Section 15.209. Above 1GHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the *average* value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

The conducted out-of-band emissions were evaluated at Tx1 for 4C UNII-1 at 5180, 5200, 5220, 5240MHz and UNII-3 at 5745, 5765, 5785, 5805 & at 5745, 5765, 5785, 5805MHz with maximum power per port for

Q/16QAM, 64QAM and 256QAM modulations, respectively. All of the out-of-band emissions measured passed, where the EUT with 256QAM configuration gave the smallest margins.

Therefore, the radiated out-of-band emissions were evaluated for selected channel configurations and modulations only.

Per KDB 789033 D02, for the radiated measurement, the field strength limit is obtained from the EIRP limit by

$$E\ (\mathrm{dB\mu V/m}) = EIRP(dBm) - 20 * \log(d) + 104.77,$$

where

- E is the field strength in V/m;
- d is the measurement distance in m;
- EIRP is the equivalent isotropically radiated power in W.

At 3m with EIRP = - 27dBm, E = 68.2 dBμV/m.

FCC Part 15.205 (a) Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	Above 38.6
13.36 - 13.41			

FCC 15.407E UNII-2 Out-of-Band Radiated Emission limits

Band (GHz)	Freq Investigated (GHz)	Emission Limits		Detector	RBW (MHz)
		Freq Range (GHz)	Limit(dBμV/MHz)		
5.15–5.25	5.10-5.40	4.5 < f < 5.15 & 5.35 < f < 5.46	54/68.2	ave/pk	1
5.25-5.35	5.10-5.40	4.5 < f < 5.15 & 5.35 < f < 5.46	54/68.2	ave/pk	1
5.47-5.725	5.40-5.8 (w/o Ch 144)	5.35 < f < 5.46	54/68.2	ave/pk	1
		5.46 < f < 5.47 & 5.725 < f < 7.25	68.2	pk	
	5.40-5.90 (with Ch 144)	5.35 < f < 5.46	54/68.2	ave/pk	
		5.46 < f < 5.47 & 5.85 < f < 7.25	68.2	pk	
5.725–5.85	5.625-5.950	$f \leq 5.650$[1] & $5.925 \leq f$	68.2	pk	1
		$5.650 \leq f \leq 5.700$[2] & $5.875 \leq f \leq 5.925$	68.2 to 105.2	pk	
		$5.700 \leq f \leq 5.720$[3] & $5.855 \leq f \leq 5.875$	105.2 to 110.8	pk	
		$5.720 \leq f \leq 5.725$[4] & $5.850 \leq f \leq 5.855$	110.8 to 122.2	pk	

[1]: $75^2 \leq \Delta f^1$, where Δf is the frequency away from band edges at 5.725 GHz and 5.85GHz, respectively;
[2]: $25 \leq \Delta f \leq 75$; [3]: $5 \leq \Delta f \leq 25$; [3]: $0 \leq \Delta f \leq 5$.

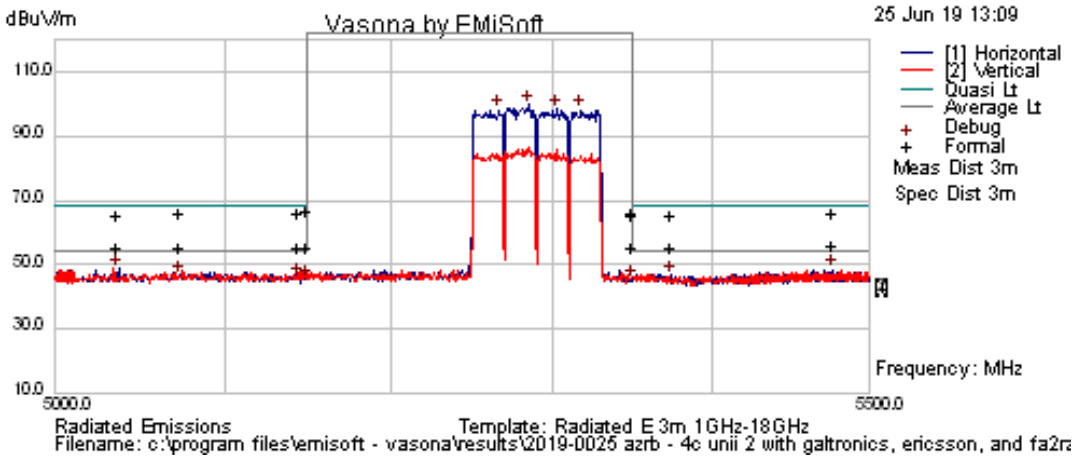
4.2.1 Out of Band Emissions - Plots

The out-of-band emissions measured for the EUT with 4C and Antennas #5, #6 and #7 are all below the FCC average and/or peak limits required in both the restricted and non-restricted bands.

NOTES: 1) Only the out-of-band emissions plots which give the minimum emission margin evaluated for 4x20MHz carriers for each antenna were used in this report. The full suite of raw data resides at the MH, New Jersey location. 2) "NA" (Not Applicable) in the tables of Formal Date below was due to the fact that only the unwanted emissions in the restricted band above 1GHz are subject to the average 54 dBuV/m limit per FCC 15.205 and 15.209.

4.2.1.1 GO4806-06664 Antenna #6

OOBE_4C_20MBW_UNII-2a_5260 TM1.1/5280 TM3.2/5300 TM3.1/5320 TM3.1a_24dBm total



Results Title:	Radiated E 3m 5GHz-5.5GHz
File Name:	c:\program files\emisoft - vasona\results\2019-0025 azrb - 4c unii 2 with galtronics, Ericsson, and fa2ra\T62 OOBE_4c-unii-2a-GA.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB with Galtronics Whip Antenna. AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010, Galtronics Whip Antenna [Ant. GO4806-06664-612, S/N W470003170-00010]; UNII-2A , 4 Carriers , 5260 M [E-TM1.1], 5280M[E-TM3.2], 5300M [E-TM3.1], 5320M [E-TM 3.1a], 21 dBm per Port, 24 dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESU-1G- E954 with 97dBuV Reference Level & Internal Attenuation 0dB, HP Preamp-E447 [Atten. E178+177) 10 dB & 6 dB Pad. Note: Additional 3 dB Pad [E175] was added to the Preamp Output and was accounted for in the Main Transducer Factor File]. Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2A OOBE Measurement.
Date:	2019-06-25 13:09:40

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5477.09	30.1	25.67	-3.45	52.32	AvgMax	H	219	206	54	-1.68	Pass	NA
5350.21	30.04	25.63	-3.55	52.13	AvgMax	H	310	152	54	-1.87	Pass	
5350.04	29.95	25.63	-3.55	52.03	AvgMax	H	236	326	54	-1.97	Pass	
5374.5	29.92	25.64	-3.53	52.03	AvgMax	H	277	8	54	-1.97	Pass	
5037.07	30.04	25.54	-3.81	51.77	AvgMax	H	308	188	54	-2.23	Pass	
5073.45	29.97	25.55	-3.78	51.74	AvgMax	H	233	22	54	-2.26	Pass	
5144.29	29.82	25.57	-3.72	51.68	AvgMax	H	141	224	54	-2.32	Pass	
5477.09	40.55	25.67	-3.45	62.77	Peak	H	219	206	68.2	-5.43	Pass	
5144.29	40.68	25.57	-3.72	62.54	Peak	H	141	224	68.2	-5.66	Pass	
5073.45	40.63	25.55	-3.78	62.4	Peak	H	233	22	68.2	-5.8	Pass	
5350.04	40.3	25.63	-3.55	62.39	Peak	H	236	326	68.2	-5.81	Pass	
5350.21	40.24	25.63	-3.55	62.33	Peak	H	310	152	68.2	-5.87	Pass	
5037.07	40.38	25.54	-3.81	62.11	Peak	H	308	188	68.2	-6.09	Pass	
5374.5	39.76	25.64	-3.53	61.87	Peak	H	277	8	68.2	-6.33	Pass	

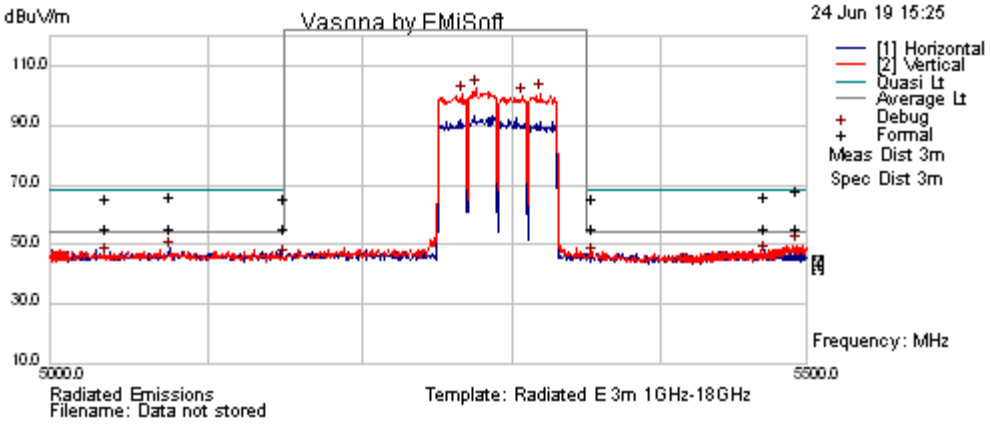
PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5477.09	26.19	25.67	-3.45	48.41	Preview	H	102	90	54	-5.59	Pass	
5037.07	26.82	25.54	-3.81	48.55	Debug	H	100	318	54	-5.45	Pass	
5073.45	24.77	25.55	-3.78	46.54	Debug	H	100	318	54	-7.46	Pass	
5144.29	24.29	25.57	-3.72	46.15	Debug	H	100	318	54	-7.85	Pass	
5350.04	22.98	25.63	-3.55	45.06	Debug	H	100	318	54	-8.94	Pass	
5350.21	23.12	25.63	-3.55	45.2	Debug	H	100	318	54	-8.8	Pass	
5374.5	24.49	25.64	-3.53	46.6	Debug	H	100	318	54	-7.4	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

4.2.1.2 FA2RA Antenna #7

OOBE_4C_20MBW_UNII-2a_5260 TM1.1/5280 TM3.2/5300 TM3.1/5320 TM3.1a 22.5dBm Total



Results Title:	Radiated E 3m 5GHz-5.5GHz
File Name:	c:\program files\emisoft - vasona\results\2019-0025 azrb - 4c unii 2 with galtronics, ericsson, and fa2ra\T61 OOBE_4c-unii-2a-fa.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, FA2RA Ant1-P-473121a.XO, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001; UNII-2A , 4 Carriers , 5260 M [E-TM1.1], 5280M[E-TM3.2], 5300M [E-TM3.1], 5320M [E-TM 3.1a], 19.55 dBm per Port, 22.5dBm total
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESU-1G- E954 with 97dBuV Reference Level & Internal Attenuation 0dB, HP Preamp-E447 [Atten. E178+177) 10 dB & 6 dB Pad. Note: Additional 3 dB Pad [E175] was added to the Preamp Output and was accounted for in the Main Transducer Factor File]. Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2A OOBE Measurement.
Date:	2019-06-24 15:26:15

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5493.21	29.96	25.67	-3.44	52.19	Average	H	217	164	54	-1.81	Pass	NA
5472.29	29.97	25.67	-3.45	52.18	AvgMax	H	184	83	54	-1.82	Pass	NA
5353.63	29.97	25.63	-3.55	52.05	AvgMax	H	195	241	54	-1.95	Pass	
5075.86	29.93	25.55	-3.78	51.71	AvgMax	H	260	111	54	-2.29	Pass	
5035.63	29.93	25.54	-3.81	51.66	AvgMax	H	152	358	54	-2.34	Pass	
5149.44	29.71	25.58	-3.71	51.57	AvgMax	H	363	245	54	-2.43	Pass	
5493.21	42.27	25.67	-3.44	64.5	Peak	V	217	164	68.2	-3.7	Pass	
5472.29	40.44	25.67	-3.45	62.65	Peak	H	184	83	68.2	-5.55	Pass	

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5075.86	40.76	25.55	-3.78	62.53	Peak	H	260	111	68.2	-5.67	Pass	
5149.44	40.3	25.58	-3.71	62.16	Peak	H	363	245	68.2	-6.04	Pass	
5353.63	39.82	25.63	-3.55	61.9	Peak	H	195	241	68.2	-6.3	Pass	
5035.63	40.1	25.54	-3.81	61.83	Peak	H	152	358	68.2	-6.37	Pass	

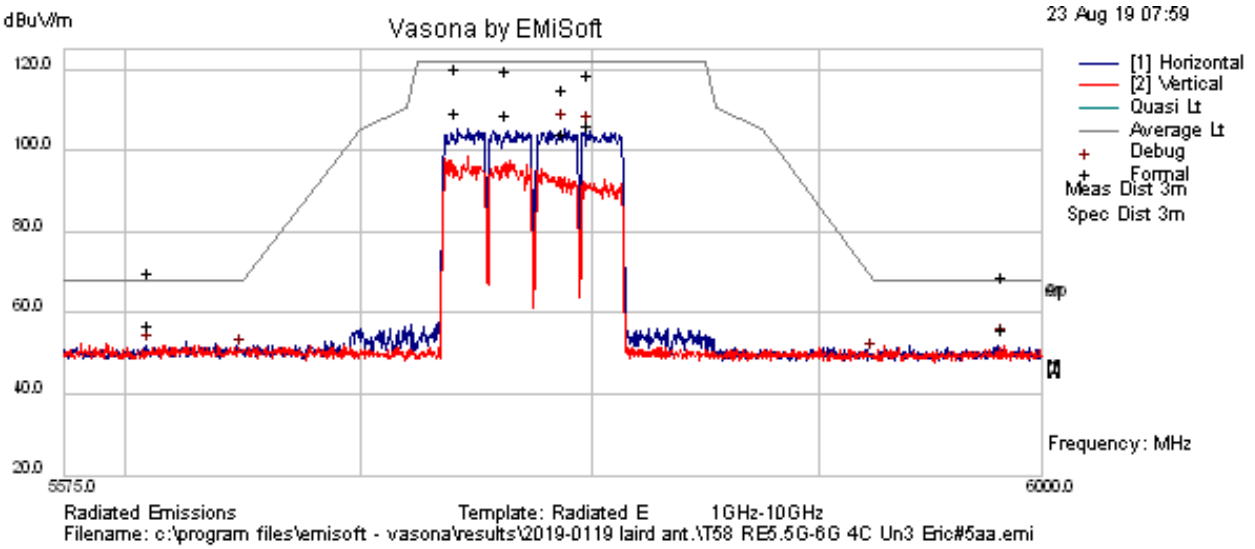
PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5035.63	24.18	25.54	-3.81	45.91	Debug	H	99	318	54	-8.09	Pass	
5075.86	26.29	25.55	-3.78	48.07	Debug	H	99	318	54	-5.93	Pass	
5149.44	23.36	25.58	-3.71	45.22	Debug	H	99	318	54	-8.78	Pass	
5267.15	78.54	25.61	-3.62	100.53	Preview	V	102	135	122	-21.47	Pass	
5275.51	80.6	25.61	-3.61	102.61	Preview	V	102	135	122	-19.39	Pass	
5307	77.73	25.62	-3.59	99.76	Preview	V	102	135	122	-22.24	Pass	
5319.22	78.72	25.63	-3.58	100.77	Preview	V	102	135	122	-21.23	Pass	
5353.63	23.92	25.63	-3.55	46.01	Debug	H	99	318	54	-7.99	Pass	
5472.29	24.45	25.67	-3.45	46.66	Debug	H	99	318	54	-7.34	Pass	
5493.21	27.36	25.67	-3.44	49.59	Preview	V	102	135	54	-4.41	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

4.2.1.3 2205 Antenna #5

OOBE_TM3.2_4C_20MBW_UNII-3_5745/5765/5785/5805_23.5dBm total



Results Title:	Radiated E 5.575GHz-6GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 laird ant.\T58 RE5.5G-6G 4C Un3 Eric#5aa.emi
Test Laboratory:	GPCL AR9-MH 24C, 16%RH, 1008mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB with Ericsson Antenna #5, AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ericsson Ant 2205 B46 LAA, S/N X61W800212, UNII3 4C-L, 5745M, 5765M, 5785M, 5805M, ETM 3.2-Q16, 23.5dBm total, (17.5dBm per carrier)
Configuration:	Powered by 120VAC / 60Hz, RE 5.5GHz-6.0 GHz, Horn Antenna E1073, ESU-1G-E954 with internal Attenuation 10dB, HP Preamp-E447, 6dB Pad-E1130, E1131, E1132 and 3dB pad, E1133 with 21dB total Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW).
Date:	2019-08-23 07:59:03

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5610.54	31.31	25.21	-3.39	53.13	Average	V	146	352	54	-0.87	Pass	NA
5610.54	44.27	25.21	-3.39	66.08	Peak	V	146	352	68.2	-2.12	Pass	
5983.2	29.63	25.24	-3.11	51.76	Average	V	220	218	54	-2.24	Pass	NA
5983.2	42.65	25.24	-3.11	64.77	Peak	V	220	218	68.2	-3.43	Pass	
5742.33	94.38	25.22	-3.29	116.31	Peak	H	173	348	122.2	-5.89	Pass	
5763.67	93.49	25.22	-3.28	115.44	Peak	H	153	309	122.2	-6.76	Pass	
5799.88	92.5	25.22	-3.25	114.47	Peak	H	137	52	122.2	-7.73	Pass	

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5788.45	89.05	25.22	-3.26	111.02	Peak	H	220	36	122.2	-11.18	Pass	
5742.33	83.16	25.22	-3.29	105.08	AvgMax	H	173	348	122.2	-17.12	Pass	
5763.67	82.86	25.22	-3.28	104.81	AvgMax	H	153	309	122.2	-17.39	Pass	
5799.88	80.12	25.22	-3.25	102.09	AvgMax	H	137	52	122.2	-20.11	Pass	
5788.45	78.14	25.22	-3.26	100.11	AvgMax	H	220	36	122.2	-22.09	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5983.2	30.05	25.24	-3.11	52.17	Preview	V	100	180	54	-1.83	Pass	
5742.33	83.51	25.22	-3.29	105.43	Preview	H	100	0	122	-16.57	Pass	
5788.45	83.3	25.22	-3.26	105.27	Preview	H	100	0	122	-16.73	Pass	
5799.88	83.07	25.22	-3.25	105.04	Preview	H	100	0	122	-16.96	Pass	
5763.67	83.02	25.22	-3.28	104.96	Preview	H	100	0	122	-17.04	Pass	
5610.54	28.93	25.21	-3.39	50.74	Debug	V	101	315	54	-3.26	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

5. FCC Section 15.407(b) (1-8), 15.205 &15.209 - Unwanted Radiated Spurious Emissions

5.1 Unwanted Radiated Spurious Emissions

Spurious Emissions were investigated over the frequency range of 30MHz to the 40GHz per 15.33.

Per KDB 789033 D02 guidance II.G.3.b, "The unwanted emission limits in both the restricted and non-restricted bands are based on radiated measurements; however, as an alternative, antenna-port conducted measurements in conjunction with cabinet emissions tests will be permitted to demonstrate compliance."

5.2 Unwanted Radiated Spurious Emissions Limits

See Section 4.2 for FCC requirements.

The Limits of FCC 15.109 Class B, 15.209 and 15.407 were given below, where the conversion between the EIRP and electrical field strength and the restricted bands of operation specified in FCC 15.205(a) were provided in Section 4.2. The FCC 15.109 Class B limits are identical to the 15.209 limits between 30MHz and 30GHz for the EUT operating in UNII bands.

FCC 15.109 Class B and 15.209 Radiated Emissions Limits

Frequency (MHz)	Field Stength (dB uV/m)	at 3m	RBW (kHz)	Detector
	FCC 15.109 Class B	FCC 15.209		
10 - 30		49.5	9	QP
30 - 88	40	40		
88 - 216	43.5	43.5		
216 - 230	46	46	120	QP
230 - 960	46	46		
960 - 1000	54	54		
1000 - 3000	54	54		Ave.
	74	74	1000	Peak
> 3000 - 5 f_c	54	54		Ave.
	74	74	1000	Peak
5 f_c - 10 f_c / 40GHz		54		Ave.
		74	1000	Peak

Combined Worst Radiated Emission Limits per 15.407 UNII-1/2/3, 15.209 and 15.109 at 3m

Frequency (MHz)	E (dBuV/m)*	RBW (kHz)	Detector
30 - 88	40/63.7	120kHz	QP/Peak
88 - 216	43.5/63.7		
216 - 960	46/63.7		
960 - 1000	54/63.7		
1G - 40G in Restricted Bands	54/68.2	1000	Ave/Peak
1G - 40G in Non-Restricted Bands	68.2	1000	Peak

*Per KDB 789033 D02, the ground reflection 4.7dB was included for frequencies below 1GHz.

The conducted spurious emissions in 30MHz-40GHz were evaluated at Tx1 for 4C UNII-1 at 5180, 5200, 5220, 5240MHz and UNII-3 at 5745, 5765, 5785, 5805 & at 5745, 5765, 5785, 5805MHz with maximum power per

port for Q/16QAM, 64QAM and 256QAM modulations, respectively. All of the spurious emissions measured were below the FCC requirements with similar performance.

Therefore, the radiated out-of-band emissions were evaluated for selected channel configuration and modulations only.

The recommendations of ANSI C63.10 were followed for EUT testing setup and cabling. The measurement guidance given in KDB 789033 D02 was followed. The emissions were maximized by rotating the turntable 360° and moving the receiving antenna height to scan and capture the emissions from the EUT.

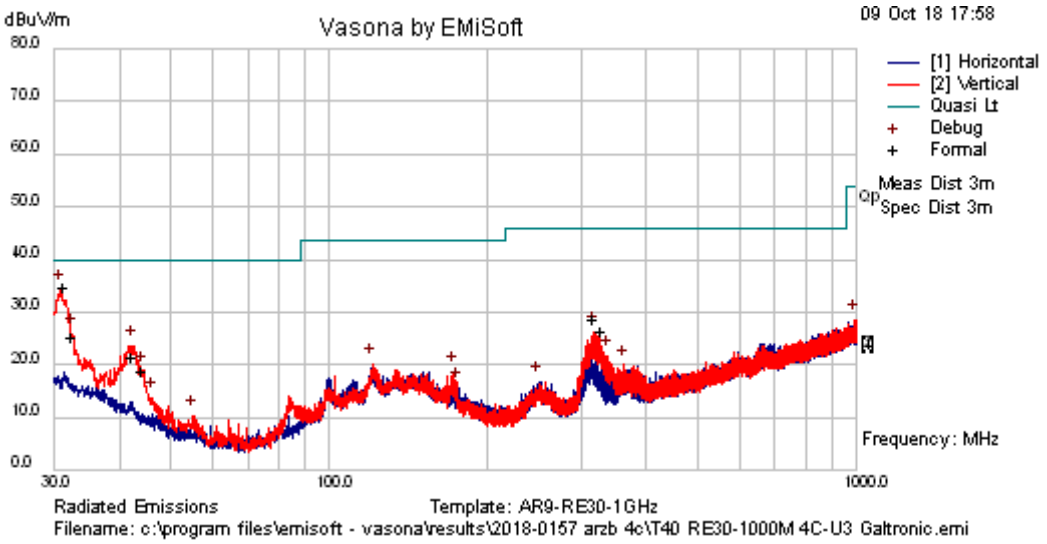
The unwanted radiated spurious emissions measured in the frequency range of 30MHz-40GHz for the EUT, which operated in UNII-1/2/3 bands and was equipped with the omni-directional antennas #6 and #7 and the directional antenna #5, respectively, met the FCC 15.407 and 15.209 requirements for intentional radiators and the FCC 15.109 Class B requirements for unintentional radiators.

5.2.1 Radiated Spurious Emissions - Plots

NOTES: 1) The plots with the minimum margins in each frequency range evaluated were used in this report. The full suite of raw data resides at the MH, New Jersey location. 2) “NA” (Not Applicable) in the tables of Formal Date below was due to the fact that only the unwanted emissions in the restricted band above 1GHz are subject to the average 54 dBuV/m limit per FCC 15.205 and 15.209.

5.2.1.1 GO4806-06664 Antenna #6

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_30dBm _30MHz-1GHz



Results Title:	AR9-RE30-1GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 AZRB 4c\T40 RE30-1000M 4C-U3 Galtronic.emi
Test Laboratory:	GPCL AR9 24C, 52% 1008mB
Test Engineer:	GM / MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB with Galtronics Antenna, AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Galtronics Ant GO4806-06664-612, S/N W470003170-00010, 4C 4C/L, 5745, 5765, 5785, 5805, ETM 3.2-QPSK 4C 27.0dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE UNII3 RE30MHz-1000MHz, Bilog Antenna E601, ESU-EIH 69 with internal Attenuation 10dB, Preamp E494, Preview BW (10kHz RBW/ 30KHz VBW); Formal BW (120KHz RBW).
Date:	2018-10-09 17:58:28

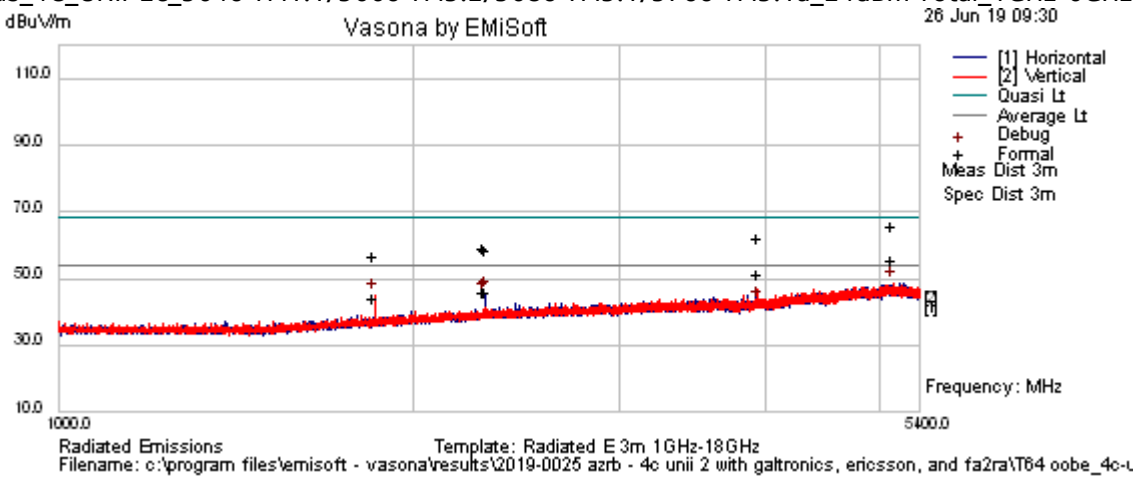
FORMAL DATA												
Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
31.452	41.12	0.31	-10	31.39	Quasi Max	V	107	245	40	-8.61	Pass	
32.539	32.59	0.32	-10.7	22.26	Quasi Max	V	158	147	40	-17.74	Pass	
318	38.29	1.03	-13.9	25.43	Quasi Max	V	146	16	46	-20.57	Pass	
42.481	33.7	0.38	-15.8	18.24	Quasi Max	V	132	193	40	-21.76	Pass	
329.23	35.96	1.05	-13.7	23.31	Quasi Max	V	188	16	46	-22.69	Pass	
44.461	31.89	0.39	-16.7	15.55	Quasi Max	V	99	11	40	-24.45	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
30.8462	43.62	0.31	-9.69	34.23	Preview	V	100	135	40	-5.77	Pass	
32.5385	36.17	0.32	-10.7	25.84	Preview	V	100	225	40	-14.16	Pass	
42.4615	39.13	0.38	-15.8	23.68	Preview	V	100	315	40	-16.32	Pass	
318	39.01	1.03	-13.9	26.15	Preview	V	200	45	46	-19.85	Pass	
44.4615	35.15	0.39	-16.7	18.81	Preview	V	100	315	40	-21.19	Pass	
329.231	36.07	1.05	-13.7	23.42	Preview	V	200	45	46	-22.58	Pass	
120.692	30.46	0.67	-11	20.12	Preview	V	380	0	43.5	-23.38	Pass	
338.462	34.17	1.07	-13.6	21.65	Preview	V	200	45	46	-24.35	Pass	
171.692	30.81	0.79	-13.1	18.53	Preview	V	100	315	43.5	-24.97	Pass	
993.301	27.75	2.81	-2.14	28.42	Preview	V	100	315	54	-25.58	Pass	
362.769	31.59	1.11	-12.7	19.98	Preview	V	100	270	46	-26.02	Pass	
46.2308	30.66	0.4	-17.4	13.63	Preview	V	100	315	40	-26.37	Pass	
175.846	28.47	0.8	-13.7	15.58	Preview	H	180	270	43.5	-27.92	Pass	
249.692	27.29	0.92	-11.4	16.8	Preview	H	100	270	46	-29.2	Pass	
55.2308	30.17	0.44	-20.4	10.21	Preview	V	200	270	40	-29.79	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_4C_UNII-2c_5640 TM1.1/5660 TM3.2/5680 TM3.1/5700 TM3.1a_24dBm Total_1GHz-6GHz



Results Title:	Radiated E 3m 1GHz-5.4GHz
File Name:	c:\program files\emisoft - vasona\results\2019-0025 azrb - 4c unii 2 with galtronics, ericsson, and fa2ra\T65 re 1-5._4c-unii-2C-ub-GA.emi
Test Laboratory	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB with Galtronic Whip Antenna. AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010, Galtronics Whip Antenna [Ant. GO4806-06664-612, S/N W470003170-00010] ; UNII-2C 4 Carriers , Upper Band [Carriers & Modulation: 5640M [E-TM1.1], 5660 [E-TM3.2], 5680M [E-TM3.1], 5700M [ETM 3.1a], 21 dBm per Port, 24 dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESU-1G- E954 with 97dBuV Reference Level & Internal Attenuation 0dB, HP Preamp-E447 [Atten. E178+177) 10 dB & 6 dB Pad. Note: Additional 3 dB Pad [E175] was added to the Preamp Output and was accounted for in the Main Transducer Factor File] Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2C [Upper Band]. FCC Radiated Spurious Emission Measurement. RE 1GHz - 5.4 GHz
Date:	2019-06-26 10:59:23

FORMAL DATA

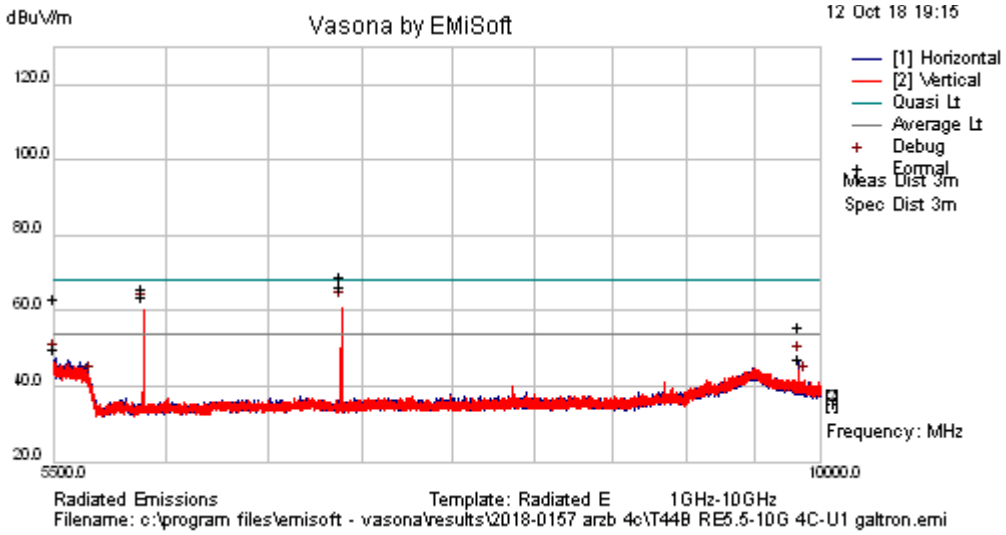
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5132.98	29.88	25.57	-3.73	51.73	AvgMax	H	373	1	54	-2.27	Pass	
5132.98	40.16	25.57	-3.73	62	Peak	H	373	1	68.2	-6.2	Pass	
3938.51	30.46	22.13	-4.8	47.78	AvgMax	H	155	310	54	-6.22	Pass	
3938.51	40.97	22.13	-4.8	58.3	Peak	H	155	310	68.2	-9.9	Pass	
2311.19	30.11	18.77	-6.61	42.27	AvgMax	H	302	185	54	-11.73	Pass	
2307.33	30.05	18.76	-6.62	42.2	AvgMax	H	164	160	54	-11.8	Pass	NA
2307.33	42.95	18.76	-6.62	55.09	Peak	H	164	160	68.2	-13.11	Pass	
2311.19	42.64	18.77	-6.61	54.8	Peak	H	302	185	68.2	-13.4	Pass	
1858.06	30.75	17.85	-8.47	40.14	AvgMax	V	317	226	54	-13.86	Pass	
1858.06	43.49	17.85	-8.47	52.88	Peak	V	317	226	68.2	-15.32	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5132.98	26.95	25.57	-3.73	48.79	Preview	H	380	315	54	-5.21	Pass	
2311.19	33.57	18.77	-6.61	45.73	Preview	H	180	45	54	-8.27	Pass	
2307.33	33.17	18.76	-6.62	45.31	Preview	H	380	135	54	-8.69	Pass	
1858.06	35.44	17.85	-8.47	44.82	Preview	V	302	135	54	-9.18	Pass	
3938.51	25.42	22.13	-4.8	42.75	Debug	H	100	323	54	-11.25	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.2_4C_UNII-1_5180/5200/5220/5240_29dBm _6GHz-10GHz



Results Title:	Radiated E 5.5GHz-10GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 AZRB 4c\T44a RE1-5.05G 4C-U1 Galtronics.emi
Test Laboratory:	GPCL AR9 24C, 52% 1008mB
Test Engineer:	MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB with Galtronics Antenna, AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Galtronics Ant GO4806-06664-612, S/N W470003170-00010, 4C 4C/L, 5180M, 5200M, 5220M, 5240M, ETM 3.2-QPSK, 26.0dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE 5.5GHz-10 GHz, Horn Antenna E1073, ESU-1G-E954 with internal Attenuation 10dB, HP Preamp-E447, E1365 UNII-1 & UNII3 Notch filter. Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW).
Date:	2018-10-12 19:17:10

Formal test Data

No	Freq.	Raw	Cable	AF	Level	Emission	Pol	Hgt	Azt	Limit	Margin	Pass/	Comments

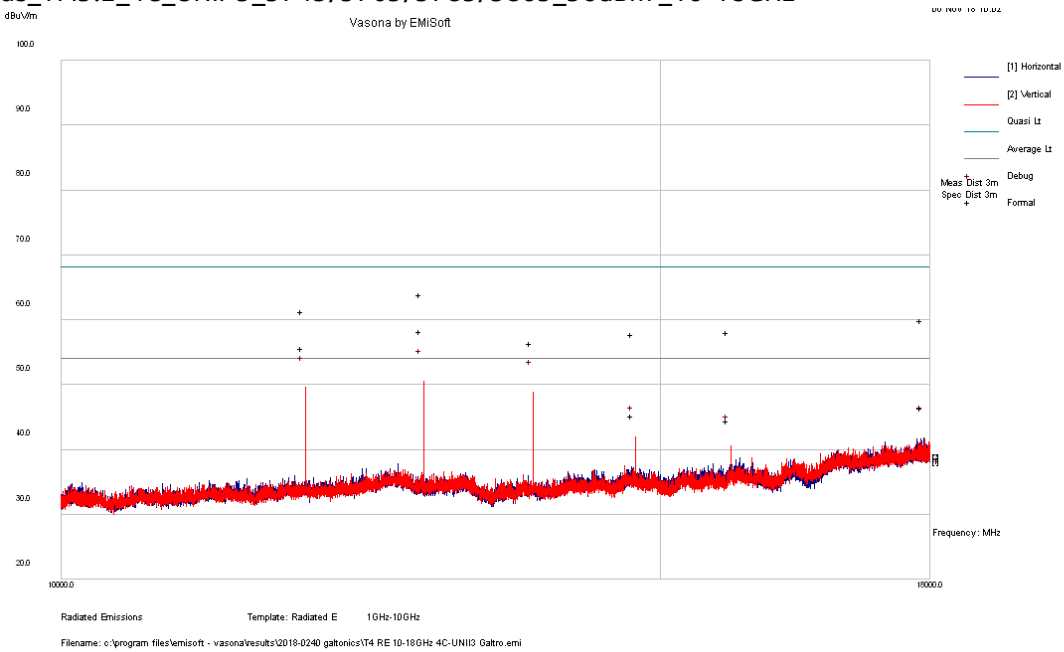
	MHz	dBuV	Loss dB	dB	dBuV/m	Type		cm	Deg.	dBuV/m	dB	Fail	
1	6881.28	59.99	4.84	-2.63	62.21	Average	V	114	304	54	8.21	NA	
2	5898.25	57.05	5.56	-3.18	59.44	Average	V	99	1	54	5.44	NA	
3	6881.28	62.64	4.84	-2.63	64.85	Peak	V	114	304	68.2	-3.35	Pass	
4	5898.25	58.92	5.56	-3.18	61.31	Peak	V	99	1	68.2	-6.89	Pass	
5	5506.02	44.2	4.7	-3.48	45.42	Average	H	219	63	54	-8.58	NA	
6	5506.02	57.58	4.7	-3.48	58.8	Peak	H	219	63	68.2	-9.4	Pass	
7	9830.33	38.02	6.79	-2.02	42.79	Average	H	222	29	54	-11.21	Pass	
8	9830.33	46.76	6.79	-2.02	51.53	Peak	H	222	29	68.2	-16.67	Pass	

Debug test Data

No	Freq. MHz	Raw dBuV	Cable Loss dB	AF dB	Level dBuV/m	Emission Type	Pol	Hgt cm	Azt Deg.	Limit dBuV/m	Margin dB	Pass/ Fail	Comments
1	6881.07	58.76	4.84	-2.63	60.97	Preview	V	100	315	54	6.97	Fail	
2	5898.32	57.91	5.56	-3.18	60.3	Preview	V	100	0	54	6.3	Fail	
3	5506.02	46.15	4.7	-3.48	47.37	Preview	H	300	225	54	-6.63	Pass	
4	9830.33	42.12	6.79	-2.02	46.89	Preview	H	200	45	54	-7.11	Pass	
5	5660.93	37.31	7.69	-3.36	41.64	Preview	H	300	45	54	-12.36	Pass	
6	9880.1	36.65	6.72	-1.97	41.41	Preview	V	300	180	54	-12.59	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement.
Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies.
Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_30dBm _10-18GHz



Results Title:	Radiated E 10GHz-18GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0240 galtonics\T4 RE 10-18GHz 4C-UNII3 Galtro.emi
Test Laboratory:	GPCL AR9 23C, 39% 1004mB
Test Engineer:	MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB with Galtronics Antenna, AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Galtronics Ant GO4806-06664-612, S/N W470003170-00010, 4C 4C/L, 5745, 5765, 5785, 5805, ETM 3.2-QPSK 4C 27.0dBm
Configuration:	Powered by 120VAC/ 60Hz, RE UNII3 4C RE 10GHz-18 GHz, Horn Antenna E1073, Pre-Amp E447, 5G-HPF-E1213, ESU-E954 internal Attenuation 0dB, Preview BW (30kHz RBW/ 3MHz VBW); Formal BW (1MHz RBW).
Date:	2018-11-06 10:09:22

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
12779.3	43.45	8.39	1.7	53.55	Average	V	157	336	54	-0.45	Pass	*
13762.6	40.72	8.8	2.1	51.61	Average	V	99	331	54	-2.39	Pass	*
11796.5	42.86	8.01	-0.02	50.85	Average	V	99	316	54	-3.15	Pass	
12779.3	49.02	8.39	1.7	59.11	Peak	V	157	336	68.2	-9.09	Pass	
11796.5	48.62	8.01	-0.02	56.61	Peak	V	99	316	68.2	-11.59	Pass	
13762.7	45.09	8.8	2.1	55.99	Peak	V	99	331	68.2	-12.21	Pass	
17925.2	26.01	11.06	4.63	41.7	Average	H	299	348	54	-12.3	Pass	
17925.2	39.53	11.06	4.63	55.22	Peak	H	299	348	68.2	-12.98	Pass	

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
14745.6	28.49	9.68	2.29	40.45	Average	V	99	245	54	-13.55	Pass	
15729	27.14	10.13	2.4	39.67	Average	V	111	19	54	-14.33	Pass	

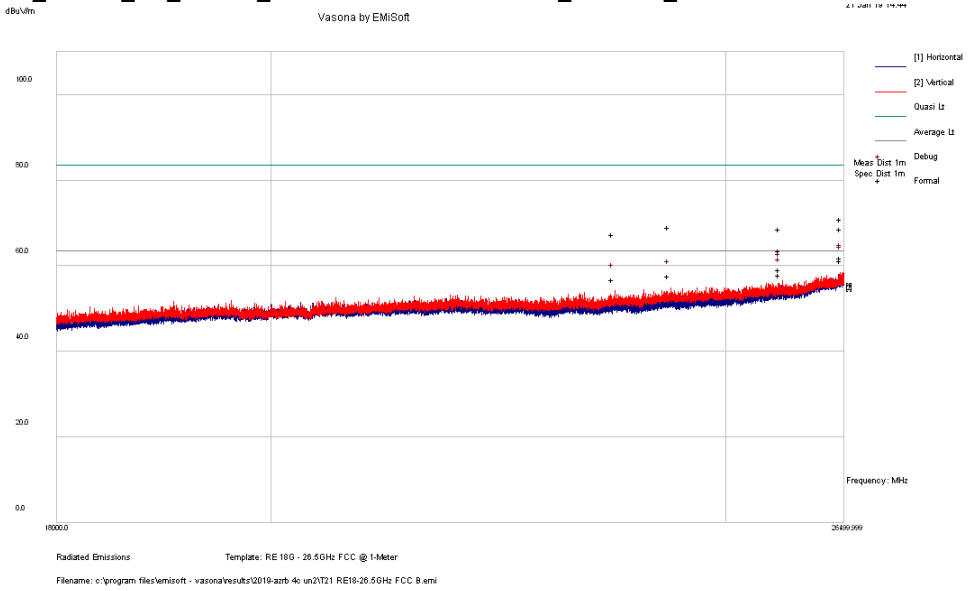
*Not in the restricted band. The signal is not related to Transmitter. Therefore, the signal is subject to Part 15 Class B limit.

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
12779.5	40.48	8.39	1.7	50.58	Preview	V	180	22	54	-3.42	Pass	
11796.8	41.6	8.01	-0.02	49.59	Preview	V	100	242	54	-4.41	Pass	
13762.9	37.97	8.8	2.1	48.86	Preview	V	100	315	54	-5.14	Pass	
14745.6	29.89	9.68	2.29	41.86	Preview	V	100	242	54	-12.14	Pass	
17925.2	26.14	11.06	4.63	41.83	Preview	H	380	110	54	-12.17	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.2_4C_UNII-2_5640/5660/5680/5700_24dBm _18-26.5GHz



Results Title:	RE 18G - 26.5GHz FCC @ 1-Meter
File Name:	c:\program files\emisoft - vasona\results\2019-azrb 4c un2\T 2 RE18-26.5GHz FCC B.emi
Test Laboratory:	GPCL AR9 21C, 6% 1000mB
Test Engineer:	GM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB P/N 474510A.101, S/N 1M181319958, 4C UNII-2 with Galtronics Omni Whip P/N GO4806-06664-612, S/N W470003170.00010, Tx1=55640, Tx2=5660MHz, Tx3=5680MHz, Tx4=5700MHz, ETM3.2 Total RF output 21.0dBm

Configuration:	Powered by 120VAC / 60Hz, FCC Class B RE 18GHz - 26.5GHz: Horn Antenna E513, Pre-Amp E1166, ESU-E954 with internal Attenuation 10dB, Preview RBW (100KHz) VBW 1GHz; Formal RBW 1GHz, VBW 3GHz
Date:	2019-01-21 14:48:26

FORMAL DATA

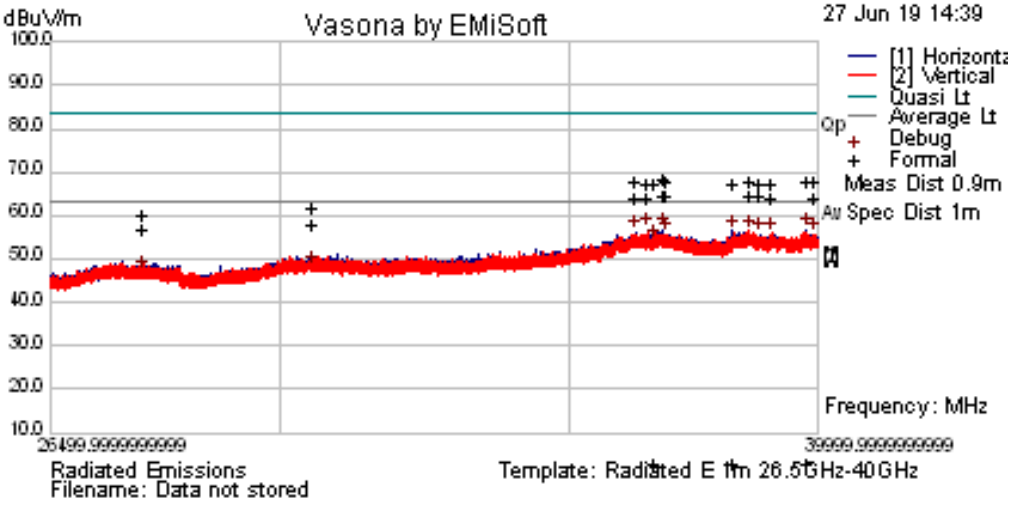
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26487.8	31.91	10.31	13.12	55.33	AvgMax	V	223	128	63.5	-8.17	Pass	NA
26483.3	31.28	10.3	13.11	54.69	AvgMax	H	270	32	63.5	-8.81	Pass	NA
25707.2	31.66	9.58	11.41	52.66	AvgMax	V	259	318	63.5	-10.84	Pass	NA
25704	30.25	9.58	11.41	51.23	AvgMax	H	128	334	63.5	-12.27	Pass	NA
24337.4	31.91	9.47	9.76	51.14	AvgMax	V	278	137	63.5	-12.36	Pass	NA
23681.2	31.29	9.31	9.6	50.2	AvgMax	V	266	314	63.5	-13.3	Pass	NA
26487.8	40.94	10.31	13.12	64.37	Peak	V	223	128	77.7	-13.3	Pass	
24337.4	43.35	9.47	9.76	62.58	Peak	V	278	137	77.7	-15.12	Pass	
25707.2	41.07	9.58	11.41	62.07	Peak	V	259	318	77.7	-15.63	Pass	
26483.3	38.62	10.3	13.11	62.03	Peak	H	270	32	77.7	-15.67	Pass	
23681.2	41.9	9.31	9.6	60.81	Peak	V	266	314	77.7	-16.89	Pass	
25704	35.95	9.58	11.41	56.94	Peak	H	128	334	77.7	-20.76	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
26487.8	35.02	10.31	13.12	58.44	Preview	V	200	90	63.5	-5.06	Pass	
26483.3	34.67	10.3	13.11	58.08	Debug	H	99	315	63.5	-5.42	Pass	
25707.2	35.36	9.58	11.41	56.35	Debug	V	99	315	63.5	-7.15	Pass	
25704	34.22	9.58	11.41	55.21	Debug	H	99	315	63.5	-8.29	Pass	
24337.4	35.51	9.47	9.76	54.74	Debug	V	99	315	63.5	-8.76	Pass	
23681.2	34.96	9.31	9.6	53.87	Debug	V	99	315	63.5	-9.63	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_4C_UNII-2c_5640 TM1.1/5660 TM3.2/5680 TM3.1/5700 TM3.1a_24dBm _26.5-40GHz



Results Title:	Radiated E 1m 26.5GHz-40GHz
File Name:	c:\program files\emisoft - vasona\results\2019-0025 azrb - 4c unii 2 with galtronics, ericsson, and fa2ra\T69 re26.5-40G-4c-unii-2C-ubGA.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB with Galtronic Whip Antenna. AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010, Galtronics Whip Antenna [Ant. GO4806-06664-612, S/N W470003170-00010] ; UNII-2C 4 Carriers , Upper Band [Carriers & Modulation: 5640M [E-TM1.1], 5660 [E-TM3.2], 5680M [E-TM3.1], 5700M [ETM 3.1a], 21 dBm per Port, 24 dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESU-1G- E954 with 97dBuV Reference Level & Internal Attenuation 0dB, Installed E523 26.5 Ghz to 40 GHz Kit. Preview BW 100 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2C [Upper Band]. FCC Radiated Spurious Emission Measurement. RE 26.5 - 40 GHz
Date:	2019-06-27 14:40:40

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
38570.7	35.72	0	26.38	62.09	AvgMax	V	112	51	63.5	-1.41	Pass	
36829.5	34.47	0	27.57	62.04	AvgMax	V	99	360	63.5	-1.46	Pass	
38787.3	35.58	0	26.3	61.87	AvgMax	V	119	280	63.5	-1.63	Pass	
36897.7	34.15	0	27.63	61.78	AvgMax	V	185	24	63.5	-1.72	Pass	
36274.8	34.66	0	26.83	61.49	AvgMax	V	109	302	63.5	-2.01	Pass	
39041.2	35.2	0	26.19	61.39	AvgMax	H	131	27	63.5	-2.11	Pass	
36510.1	34.1	0	27.26	61.36	AvgMax	V	136	116	63.5	-2.14	Pass	
39954	34.79	0	26.44	61.23	AvgMax	H	203	106	63.5	-2.27	Pass	
30525.9	33.61	0	21.89	55.49	AvgMax	V	162	2	63.5	-8.01	Pass	

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
27870.9	34.65	0	19.36	54.01	AvgMax	V	119	126	63.5	-9.49	Pass	
36829.5	38.39	0	27.57	65.96	Peak	V	99	360	77.7	-11.74	Pass	
39772.7	39.26	0	26.2	65.47	Peak	V	179	223	77.7	-12.23	Pass	
36274.8	38.63	0	26.83	65.45	Peak	V	109	302	77.7	-12.25	Pass	
38570.7	39.05	0	26.38	65.43	Peak	V	112	51	77.7	-12.27	Pass	
39954	38.84	0	26.44	65.27	Peak	H	203	106	77.7	-12.43	Pass	
36897.7	37.54	0	27.63	65.17	Peak	V	185	24	77.7	-12.53	Pass	
39041.2	38.73	0	26.19	64.91	Peak	H	131	27	77.7	-12.79	Pass	
38219.8	38.17	0	26.73	64.91	Peak	V	180	283	77.7	-12.79	Pass	
36510.1	37.62	0	27.26	64.89	Peak	V	136	116	77.7	-12.81	Pass	
36671.6	37.32	0	27.42	64.74	Peak	V	184	104	77.7	-12.96	Pass	
38787.3	38.31	0	26.3	64.61	Peak	V	119	280	77.7	-13.09	Pass	
30525.9	37.19	0	21.89	59.07	Peak	V	162	2	77.7	-18.63	Pass	
27870.9	38.22	0	19.36	57.58	Peak	V	119	126	77.7	-20.12	Pass	
38219.8	-26.73	0	26.73	0	AvgMax	V	180	283	63.5	-63.5	Pass	
36671.6	-27.42	0	27.42	0	AvgMax	V	184	104	63.5	-63.5	Pass	
39772.7	-26.2	0	26.2	0	AvgMax	V	179	223	63.5	-63.5	Pass	

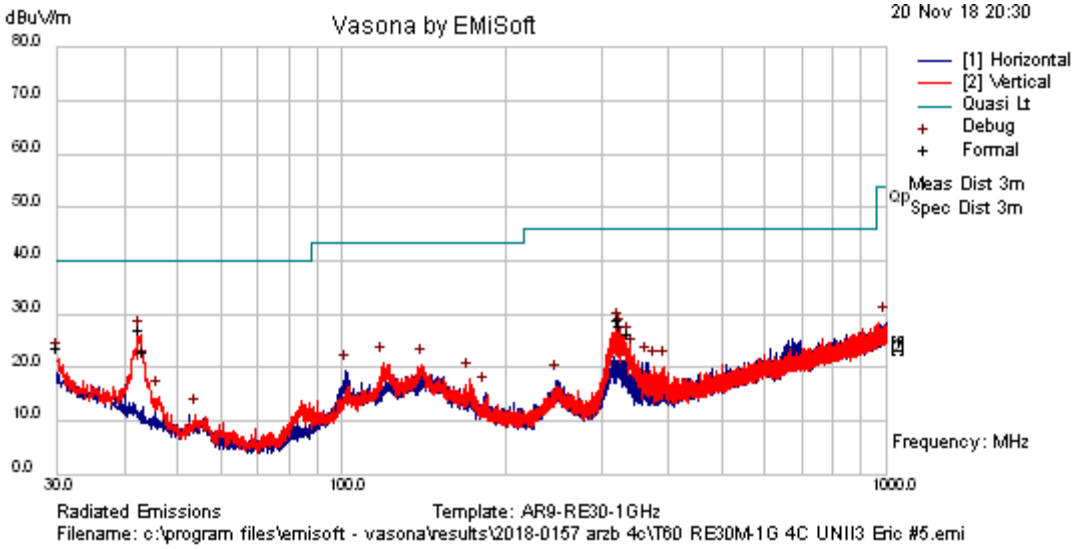
PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
39772.7	30.7	0	26.2	56.87	Preview	V	102	22	63.5	-6.6	Pass	
36829.5	29.2	0	27.6	56.76	Preview	V	150	66	63.5	-6.7	Pass	
36510.1	29.4	0	27.3	56.68	Preview	V	102	0	63.5	-6.8	Pass	
38219.8	29.8	0	26.7	56.55	Preview	V	175	44	63.5	-7	Pass	
38570.7	30.2	0	26.4	56.53	Preview	V	102	0	63.5	-7	Pass	
36274.8	29.4	0	26.8	56.23	Preview	V	175	0	63.5	-7.3	Pass	
39041.2	29.8	0	26.2	55.99	Preview	H	150	88	63.5	-7.5	Pass	
39954	29.4	0	26.4	55.8	Preview	H	150	44	63.5	-7.7	Pass	
36897.7	28.1	0	27.6	55.71	Preview	V	175	0	63.5	-7.8	Pass	
38787.3	29.3	0	26.3	55.63	Preview	V	125	22	63.5	-7.9	Pass	
36671.6	26.6	0	27.4	54	Preview	V	102	0	63.5	-9.5	Pass	
30525.9	26.29	0	21.89	48.18	Preview	V	98	0	63.5	-15.32	Pass	
27870.9	27.73	0	19.36	47.09	Preview	V	98	0	63.5	-16.41	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

5.2.1.2 2205 Antenna #5

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_26.5dBm_30MHz-1GHz



Results Title:	AR9-RE30-1GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 ARZB 4c\T60 RE30M-1G 4C UNII3 Eric #5.emi
Test Laboratory:	GPCL AR9 22C, 26% 988mB
Test Engineer:	MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB with Ericsson Antenna #5, AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ericsson Ant 2205 B46 LAA, S/N X61W800212, UNII3 4C-L, 5745M, 5765M, 5785M, 5805M, ETM 3.2-Q16, 23.5dBm total, (17.5dBm per carrier)
Configuration:	Powered by 120VAC / 60Hz, RE UNII3, RE30MHz-1 GHz, BiLog Antenna E601, ESU-E954, with internal Attenuation 10dB, Preamp E494, Preview BW (10kHz RBW/ 30KHz VBW); Formal BW (120KHz RBW).
Date:	2018-11-20 20:30:13

FORMAL DATA

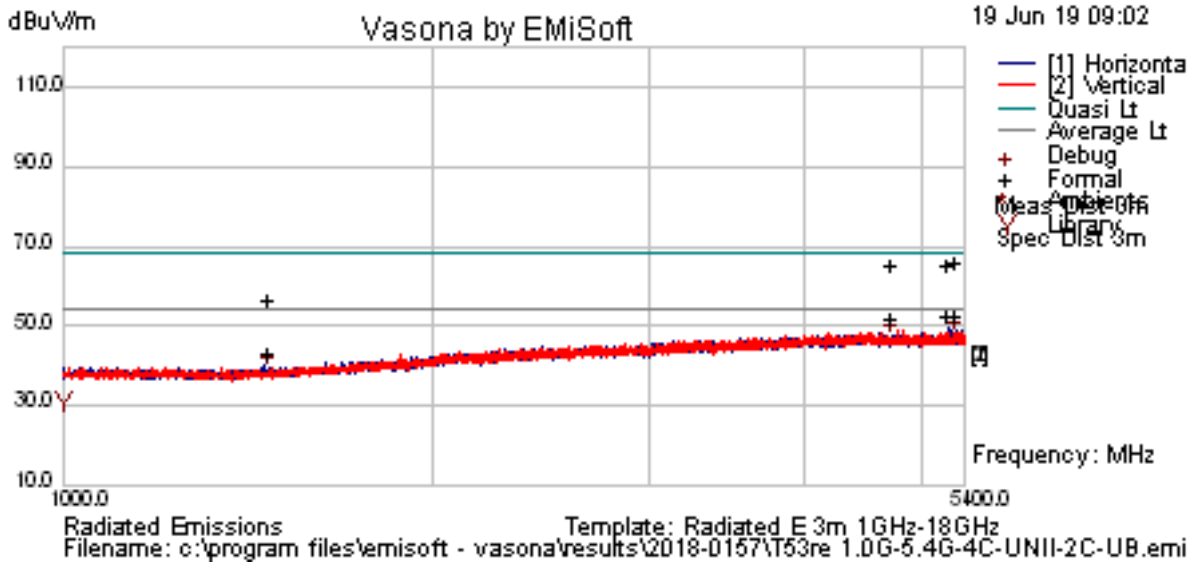
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
42.663	39.27	0.38	-15.9	23.72	Quasi Max	V	128	323	40	-16.28	Pass	
30.2308	29.5	0.3	-9.32	20.48	Quasi Max	V	158	218	40	-19.52	Pass	
43.447	35.71	0.38	-16.3	19.82	Quasi Max	V	130	355	40	-20.18	Pass	
323.691	38.54	1.04	-13.8	25.8	Quasi Max	V	156	39	46	-20.2	Pass	
326.923	37.17	1.04	-13.7	24.49	Quasi Max	V	100	11	46	-21.51	Pass	
337.914	35.72	1.06	-13.6	23.2	Quasi Max	V	150	16	46	-22.8	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
42.6923	41.49	0.38	-15.9	25.93	Preview	V	100	315	40	-14.07	Pass	
30.2308	30.48	0.3	-9.32	21.46	Preview	V	100	180	40	-18.54	Pass	
323.692	39.87	1.04	-13.8	27.14	Preview	V	100	0	46	-18.86	Pass	
326.923	38.98	1.04	-13.7	26.29	Preview	V	100	0	46	-19.71	Pass	
43.5385	36.07	0.38	-16.3	20.13	Preview	V	100	0	40	-19.87	Pass	
337.846	37.25	1.06	-13.6	24.72	Preview	V	100	0	46	-21.28	Pass	
119.231	31.39	0.66	-11.2	20.84	Preview	V	100	0	43.5	-22.66	Pass	
140.692	29.49	0.72	-9.75	20.46	Preview	V	100	180	43.5	-23.04	Pass	
344.769	34.78	1.08	-13.5	22.35	Preview	V	200	0	46	-23.65	Pass	
102.077	32.68	0.61	-13.9	19.42	Preview	H	380	90	43.5	-24.08	Pass	
363.846	32.59	1.11	-12.7	21.04	Preview	H	100	180	46	-24.96	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.1a_4C_UNII-2c_5640/5660/5680/5700_20.5dBm_1GHz-6GHz



Results Title:	Radiated E 3m 1GHz-6GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157\T53re 1.0G-5.4G-4C-UNII-2C-UB.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB with Ericson Antenna IP-55/TYPE 3R, AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010,

	UNII-2C, 4Carriers, 5640M [E-TM3.1a], 5660 [E-TM3.1a], 5680M [E-TM3.1a], 5700M [ETM 3.1a], 17.5dBm per port, 20.5dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESI-1G-E1190 with i 92dBuV Reference Level & nternal Attenuation 0dB, HP Preamp-E447 5G E177+E176 (10 dB & 6 dB), Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2C [Upper Band] Radiated Emissions Spurious Measurement.RE 1GHz-5.4 GHz,
Date:	2019-06-19 09:02:56

FORMAL DATA

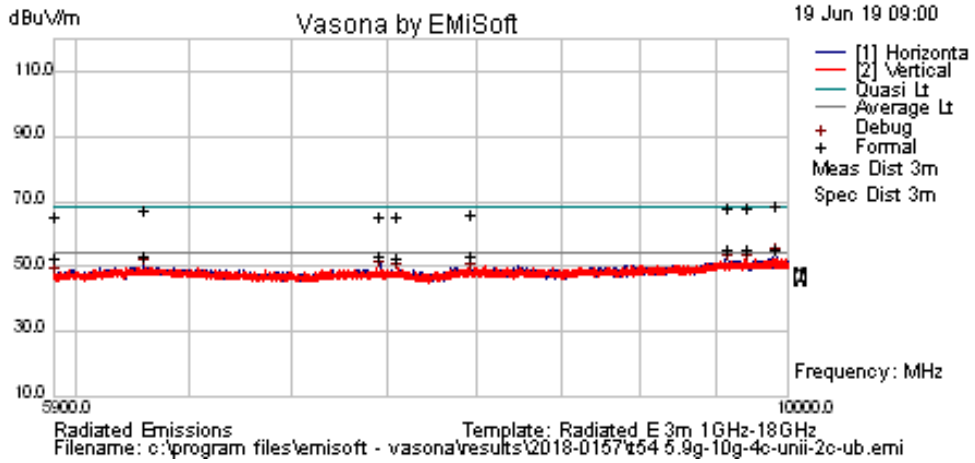
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5320.82	30.32	22.63	-3.57	49.38	AvgMax	H	114	12	54	-4.62	Pass	NA
5240.85	30.06	22.6	-3.64	49.02	AvgMax	H	134	349	54	-4.98	Pass	NA
5320.82	43.67	22.63	-3.57	62.72	Peak	H	114	12	68.2	-5.48	Pass	
4727.18	29.96	22.45	-3.96	48.46	AvgMax	H	288	139	54	-5.54	Pass	
5240.85	43	22.6	-3.64	61.96	Peak	H	134	349	68.2	-6.24	Pass	
4727.18	43.26	22.45	-3.96	61.76	Peak	H	288	139	68.2	-6.44	Pass	
1470.12	33.74	17.64	-11.4	40	AvgMax	H	100	219	54	-14	Pass	
1470.12	47.06	17.64	-11.4	53.32	Peak	H	100	219	68.2	-14.88	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5240.85	30.33	22.6	-3.64	49.3	Preview	H	102	0	54	-4.7	Pass	
5320.82	29.05	22.63	-3.57	48.1	Debug	H	100	322	54	-5.9	Pass	
4727.18	28.61	22.45	-3.96	47.11	Debug	H	100	322	54	-6.89	Pass	
1470.12	32.65	17.64	-11.4	38.91	Debug	H	100	322	54	-15.09	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.1a_4C_UNII-2C_5640/5660/5680/5700_20.5dBm _6-10GHz



Results Title:	Radiated E 3m 5.9GHz-10GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157\t54 5.9g-10g-4c-unii-2C-UB.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB with Ericson Antenna IP-55/TYPE 3R, AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010, UNII-2C, 4Carriers, 5640M [E-TM3.1a], 5660 [E-TM3.1a], 5680M [E-TM3.1a], 5700M [ETM 3.1a], 17.5dBm per port, 20.5dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESI-1G-E1190 with 92dBuV Reference Level & Internal Attenuation 0dB, HP Preamp-E447 5G E177+E176 (10 dB & 6 dB), Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2C [Upper Band]. Radiated Emission Spurious Measurement. RE 5.9GHz-10 GHz,
Date:	2019-06-19 09:00:06

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
9927.86	29.54	24.47	-1.96	52.06	Average	H	118	285	54	-1.94	Pass	NA
9719.1	29.78	24.25	-2.15	51.87	AvgMax	H	266	266	54	-2.13	Pass	NA
9584.15	29.78	24.1	-2.28	51.6	AvgMax	H	125	55	54	-2.4	Pass	NA
9927.86	42.72	24.47	-1.96	65.24	Peak	H	275	296	68.2	-2.96	Pass	
9719.1	42.31	24.25	-2.15	64.41	Peak	H	266	266	68.2	-3.79	Pass	
9584.15	42.59	24.1	-2.28	64.4	Peak	H	125	55	68.2	-3.8	Pass	
6305.57	29.87	22.66	-2.68	49.85	AvgMax	H	261	142	54	-4.15	Pass	NA
7464.28	29.73	22.46	-2.59	49.6	AvgMax	H	148	53	54	-4.4	Pass	
6305.57	43.8	22.66	-2.68	63.78	Peak	H	261	142	68.2	-4.42	Pass	
7968.05	29.68	22.56	-2.67	49.57	AvgMax	H	157	231	54	-4.43	Pass	NA
7555.67	29.49	22.48	-2.6	49.37	AvgMax	H	166	293	54	-4.63	Pass	

FORMAL DATA

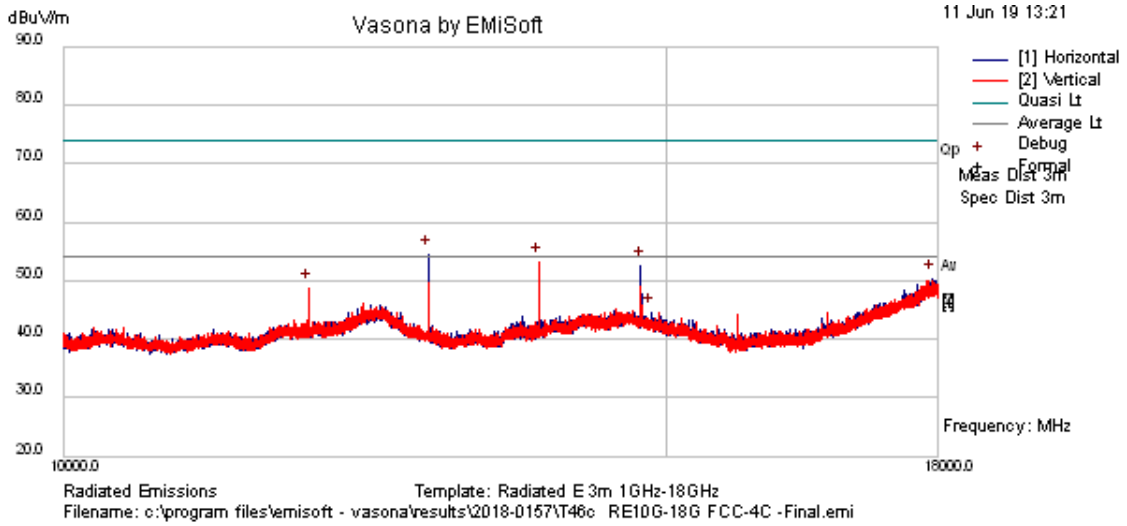
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
5907.79	29.2	22.79	-3.02	48.96	AvgMax	H	118	285	54	-5.04	Pass	NA
7968.05	42.72	22.56	-2.67	62.61	Peak	H	157	231	68.2	-5.59	Pass	
5907.79	42.45	22.79	-3.02	62.21	Peak	H	118	285	68.2	-5.99	Pass	
7555.67	42.31	22.48	-2.6	62.19	Peak	H	166	293	68.2	-6.01	Pass	
7464.28	42.31	22.46	-2.59	62.18	Peak	H	148	53	68.2	-6.02	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
9927.86	30.29	24.47	-1.96	52.8	Preview	H	180	270	54	-1.2	Pass	
9584.15	28.84	24.1	-2.28	50.66	Debug	H	100	320	54	-3.34	Pass	
9719.1	28.7	24.25	-2.15	50.8	Debug	H	100	320	54	-3.2	Pass	
7464.28	28.67	22.46	-2.59	48.54	Debug	H	100	320	54	-5.46	Pass	
7555.67	27.95	22.48	-2.6	47.83	Debug	H	100	320	54	-6.17	Pass	
5907.79	26.87	22.79	-3.02	46.64	Debug	H	100	320	54	-7.36	Pass	
6305.57	29.13	22.66	-2.68	49.11	Debug	H	100	320	54	-4.89	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_25.5dBm_10-18GHz



Results Title:	Radiated E 3m 1GHz-18GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157\T47 RE10G-18G FCC-4C -Final.emi
Test Laboratory:	GPCL- AR7-MH 22C, 35%RH,1001mB
Test Engineer:	MJS/EEM/CP
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless

EUT Details:	AZRB with Ericson Antenna IP-55/TYPE 3R, AZRB P/N 2205 B46 LAA-20170916, S/N X61W800212, PSU PN-474130A.102, SNU7182703949, W470003170-00010, UNII-3 4C , 5765M [E-TM1.1], 5785M [E-TM3.2], 5805M [E-TM3.1], 5825M [ETM 3.1a], 22.5dBm per carrier, 25.5dBm total.
Configuration:	Powered by 120VAC / 60Hz, RE 10GHz-18 GHz, Horn Antenna E393, ESI-1G-E1190 with internal Attenuation 10dB, HP Preamp-E447 5G HPF-E1212, Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). Spec: FCC Part 15 Class B
Date:	2019-06-12 09:48:45

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
14745.7	38.9	9.34	4.65	52.9	AvgMax	H	108	29	54	-1.1	Pass	*
14745.7	38.85	9.34	4.65	52.85	Average	H	115	29	54	-1.15	Pass	*
13762.6	38.06	9.01	4.47	51.54	AvgMax	V	152	283	54	-2.46	Pass	*
14745.6	36.58	9.34	4.65	50.58	AvgMax	H	171	215	54	-3.42	Pass	*
12779.5	38.43	8.95	1.71	49.09	AvgMax	H	163	337	54	-4.91	Pass	*
17918.9	29.2	9.67	9.67	48.54	AvgMax	H	144	291	54	-5.46	Pass	
11796.5	36.77	11.03	0.48	48.29	AvgMax	V	99	360	54	-5.71	Pass	
14848.6	29.09	9.36	4.23	42.68	AvgMax	H	184	228	54	-11.32	Pass	*
17918.9	41.41	9.67	9.67	60.75	Peak	H	144	291	68.2	-7.45	Pass	
14745.7	46.47	9.34	4.65	60.47	Peak	H	115	29	68.2	-7.73	Pass	
14745.7	46.47	9.34	4.65	60.47	Peak	H	105	16	68.2	-7.73	Pass	
14745.7	46.09	9.34	4.65	60.09	Peak	H	108	29	68.2	-8.11	Pass	
13762.6	45.17	9.01	4.47	58.66	Peak	V	152	283	68.2	-9.54	Pass	
11796.5	46.6	11.03	0.48	58.11	Peak	V	99	360	68.2	-10.09	Pass	
14745.6	44.1	9.34	4.65	58.1	Peak	H	171	215	68.2	-10.1	Pass	
12779.5	46.35	8.95	1.71	57	Peak	H	163	337	68.2	-11.2	Pass	

*Not in the restricted band. The signal is not related to the carrier ON/OFF. Therefore, the signal is subject to Part 15 Class B limit.

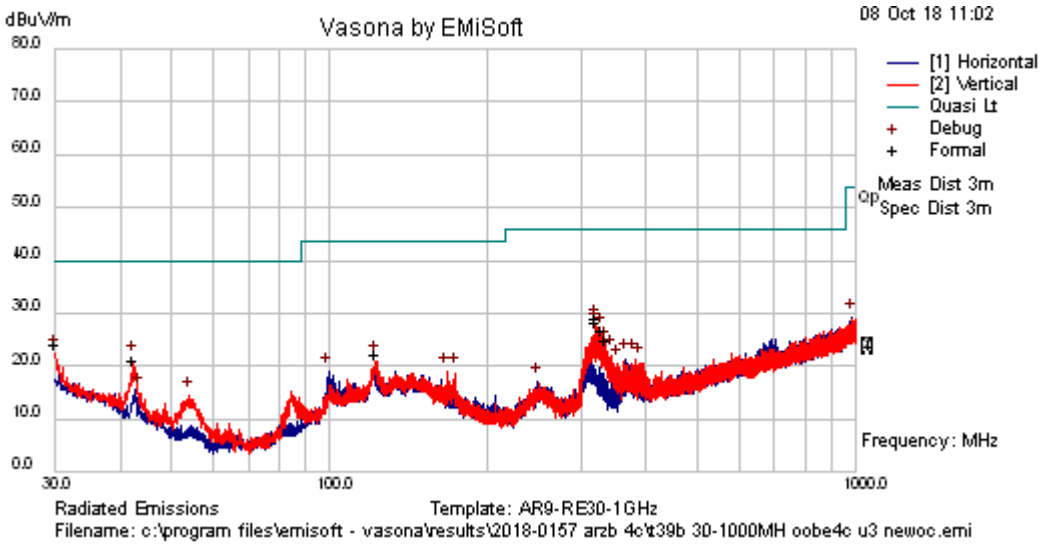
PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
12779.7	43.84	8.95	1.71	54.5	Preview	H	102	330	54	0.5	Fail	
13762.7	39.62	9.01	4.47	53.1	Preview	V	102	0	54	-0.9	Pass	
14745.7	38.47	9.34	4.65	52.46	Preview	H	180	352	54	-1.54	Pass	
17918.9	30.8	9.67	9.67	50.14	Preview	H	380	308	54	-3.86	Pass	
11796.7	37.17	11.03	0.48	48.68	Preview	V	102	0	54	-5.32	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

5.2.1.3 FA2RA Antenna #7

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_28.5dBm_30MHz-10GHz



Results Title:	AR9-RE30-1GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 arzb 4c\t39b 30-1000MH oobe4c u3 newoc.emi
Test Laboratory:	GPCL AR9 25C, 41% 1004mB
Test Engineer:	GM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ant1-P-473121a.xo, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001, 4C, ETM 3.1a-256QAM, 4C 25.0dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE UNII 3 30MHz-1000MHz, Bicon Antenna E601, ESU, EIH 69 with internal Attenuation 10dB, Preamp E494, Preview BW (10kHz RBW/ 30KHz VBW); Formal BW (120KHz RBW).
Date:	2018-10-08 11:02:29

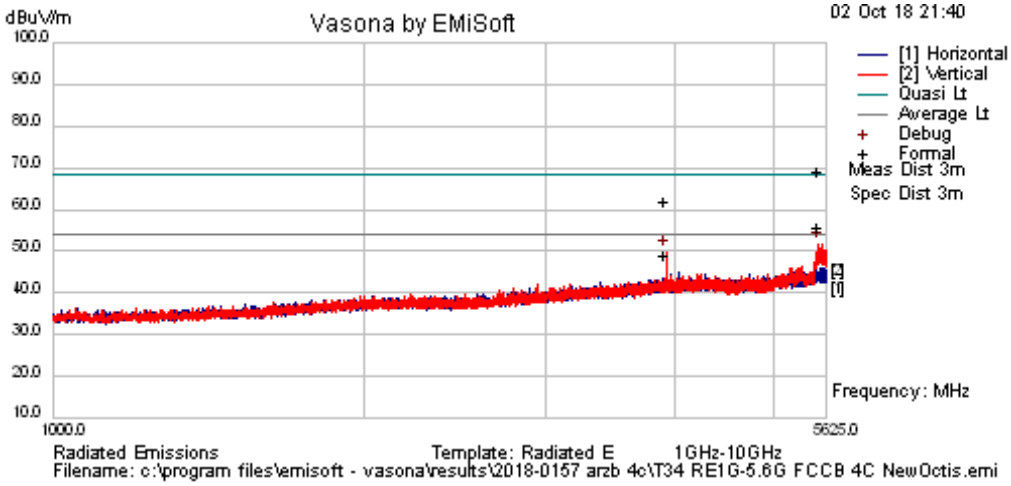
FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
30.028	29.86	0.3	-9.2	20.95	Quasi Max	V	140	235	40	-19.05	Pass	
321.064	38.71	1.03	-13.8	25.91	Quasi Max	V	124	15	46	-20.09	Pass	
321.839	37.8	1.03	-13.8	25.03	Quasi Max	V	162	355	46	-20.97	Pass	
42.343	33.26	0.37	-15.8	17.86	Quasi Max	V	99	339	40	-22.14	Pass	
329.719	36.2	1.05	-13.7	23.56	Quasi Max	V	136	35	46	-22.44	Pass	
335.171	34.19	1.06	-13.6	21.62	Quasi Max	V	193	30	46	-24.38	Pass	
122.769	29.03	0.67	-10.7	18.99	Quasi Max	V	180	301	43.5	-24.51	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
30.0769	31.16	0.3	-9.23	22.23	Preview	V	100	270	40	-17.77	Pass	
321.077	40.53	1.03	-13.8	27.74	Preview	V	100	0	46	-18.26	Pass	
321.846	39.83	1.03	-13.8	27.06	Preview	V	100	0	46	-18.94	Pass	
42.3077	36.44	0.37	-15.8	21.06	Preview	V	100	45	40	-18.94	Pass	
329.769	38.84	1.05	-13.7	26.2	Preview	V	200	45	46	-19.8	Pass	
335.154	36.18	1.06	-13.6	23.61	Preview	V	200	0	46	-22.39	Pass	
122.769	31.06	0.67	-10.7	21.02	Preview	V	100	90	43.5	-22.48	Pass	
343.154	34.4	1.07	-13.5	21.95	Preview	V	200	0	46	-24.05	Pass	
380.615	32.18	1.14	-11.9	21.41	Preview	V	100	0	46	-24.59	Pass	
166.692	30.36	0.78	-12.3	18.87	Preview	V	100	315	43.5	-24.63	Pass	
99.6154	32.57	0.6	-14.3	18.86	Preview	H	180	90	43.5	-24.64	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.



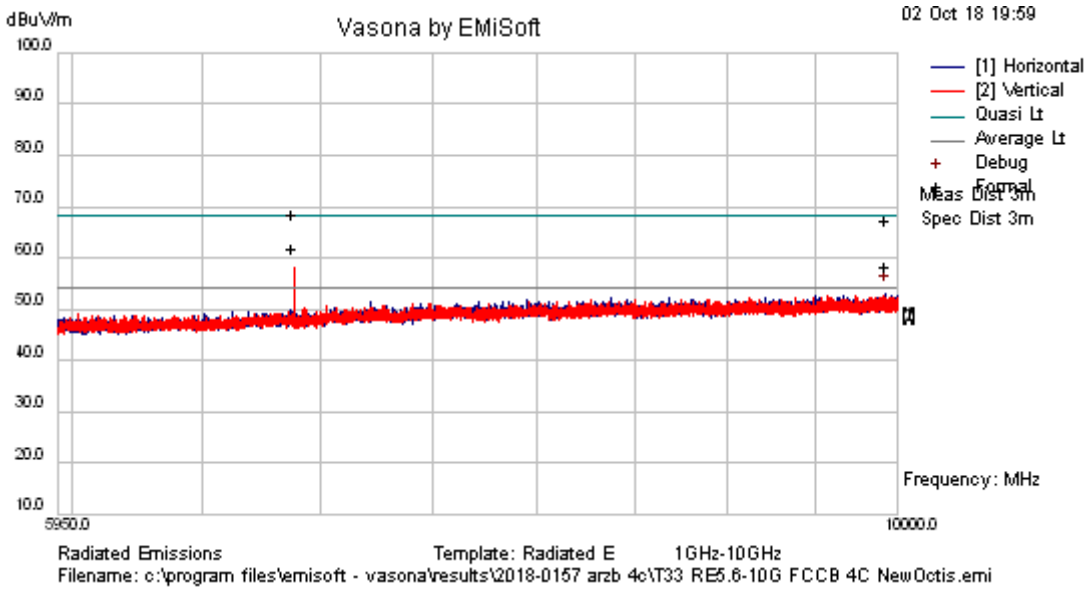
Results Title:	Radiated E 1GHz-10GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 arzb 4c\T34 RE1G-5.6G FCCB 4C NewOctis.emi
Test Laboratory:	GPCL AR9 23C, 46% 1006mB
Test Engineer:	MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ant1-P-473121a.xo, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001, ETM 3.2, 4C/L 5745M, 5765M, 5785M, 5805M, 25.5dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE 1 GHz-5.625 GHz, Horn Antenna E433, ESU-1G-EIH 69 with internal Attenuation 0dB, HP Preamp-E123, 6dB pad-E1130, E1131 and 3dB pad E1133 with 15dB Total. Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW).
Date:	2018-10-02 21:40:42

FORMAL DATA												
Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
5532.4	31.78	19.23	1.64	52.65	Average	V	114	174	54	-1.35	Pass	NA
5532.4	44.82	19.23	1.64	65.69	Peak	V	114	174	68.2	-2.51	Pass	
3932.18	27.46	18.37	-0.23	45.6	Average	V	237	10	54	-8.4	Pass	
3932.18	40.4	18.37	-0.23	58.54	Peak	V	237	10	68.2	-9.66	Pass	

PREVIEW DATA

Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
5523.17	30.86	19.23	1.63	51.72	Preview	V	100	352	54	-2.28	Pass	
3932.18	31.58	18.37	-0.23	49.72	Preview	V	100	45	54	-4.28	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.



Results Title:	Radiated E 6GHz-10GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 AZRB 4c\T33 RE5.6-10G FCCB 4C New Octis.emi
Test Laboratory:	GPCL AR9 23C, 46% 1006mB
Test Engineer:	MJS
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ant1-P-473121a.xo, SNP8182400001, Ant2-P-473121A.XO,

	SNP8182400001, ETM 3.2, 4C/L 5745M, 5765M, 5785M, 5805M, 25.5dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE 5.95GHz-10 GHz, Horn Antenna E433, ESU-1G-EIH 69 with internal Attenuation 0dB, HP Preamp-E123, 6dB pad-E1130, E1131 and 3dB pad E1133, 15 Total. Preview BW (30 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW).
Date:	2018-10-02 19:59:05

Formal Data

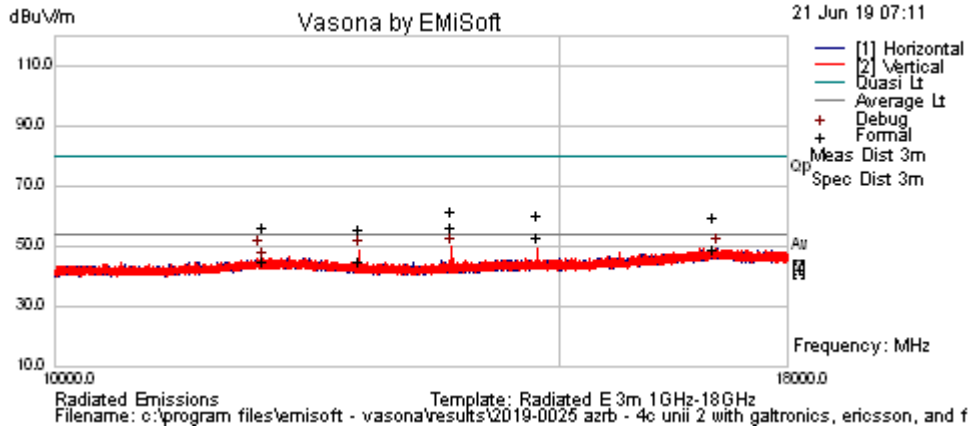
No	Freq. MHz	Raw dBuV	Cable Loss dB	AF dB	Level dBuV/m	Emission Type	Pol	Hgt cm	Azt Deg.	Limit dBuV/m	Margin dB	Pass/ Fail	Comments
1	6881.72	28.09	19.56	2.9	50.55	Average	H	117	243	54	-3.45	Pass	NA
2	9923.93	24.76	20.92	4.67	50.36	Average	H	147	31	54	-3.64	Pass	NA
3	9923.93	37.63	20.92	4.67	63.23	Peak	H	147	31	68.2	-4.97	Pass	
4	6881.72	39.66	19.56	2.9	62.12	Peak	H	117	243	68.2	-6.08	Pass	

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
6881.72	35.64	19.56	2.9	58.1	Preview	H	170	352	54	4.1	Fail	
9923.93	27.26	20.92	4.67	52.86	Preview	H	100	22	54	-1.14	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_4C_UNII-2c_5640 TM1.1/5660 TM3.2/5680 TM3.1/5700 TM3.1a_22.5dBm total_10GHz-18GHz



Results Title:	Radiated E 3m 1GHz-18GHz
File Name:	c:\program files\emisoft - vasona\results\2019-0025 azrb - 4c unii 2 with galtronics, ericsson, and fa2ra\t56 re 10-18g-4c-unii-2c-ub-FA.emi
Test Laboratory:	GPCL- AR7-MH 22C, %RH,1001mB
Test Engineer:	EEM

Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia Wireless
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, FA2RA Ant1-P-473121a.XO, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001; UNII-2C , 4Carriers , 5640M [E-TM1.1], 5660 [E-TM3.2], 5680M [E-TM3.1], 5700M [ETM 3.1a], 19.55dBm per Port, 22.5dBm total.
Configuration:	Powered by 120VAC / 60Hz, Horn Antenna E1074, ESU-1G-E954 with 97dBuV Reference Level & Internal Attenuation 0dB, HP Preamp-E447 5G E1212 10GHz-26 GHz High Pass Filter), Preview BW (100 kHz RBW/ 3000 KHz VBW); Formal BW (1MHz RBW). UNII 2C [Upper Band]. FCC Part 15B Class B Radiated Emission Spurious Measurement. RE 10GHz - 18 GHz, FA2RA Antenna.
Date:	2019-06-21 07:11:55

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
13762.6	41.73	9.01	2.24	52.98	AvgMax	H	99	305	54	-1.02	Pass	*
14745.6	38.65	9.34	2.19	50.18	AvgMax	V	98	338	54	-3.82	Pass	*
16965	30.33	10.47	4.8	45.61	AvgMax	H	289	237	54	-8.39	Pass	NA
11830.6	31.07	11.08	-0.03	42.11	AvgMax	H	288	40	54	-11.89	Pass	*
12779.5	31.02	8.95	1.77	41.74	AvgMax	V	163	144	54	-12.26	Pass	*
13762.6	47.21	9.01	2.24	58.46	Peak	H	99	305	68.2	-9.74	Pass	
14745.6	45.97	9.34	2.19	57.5	Peak	V	98	338	68.2	-10.7	Pass	
16965	41.19	10.47	4.8	56.46	Peak	H	289	237	68.2	-11.74	Pass	
11830.6	42.34	11.08	-0.03	53.39	Peak	H	288	40	68.2	-14.81	Pass	
12779.5	41.83	8.95	1.77	52.54	Peak	V	163	144	68.2	-15.66	Pass	

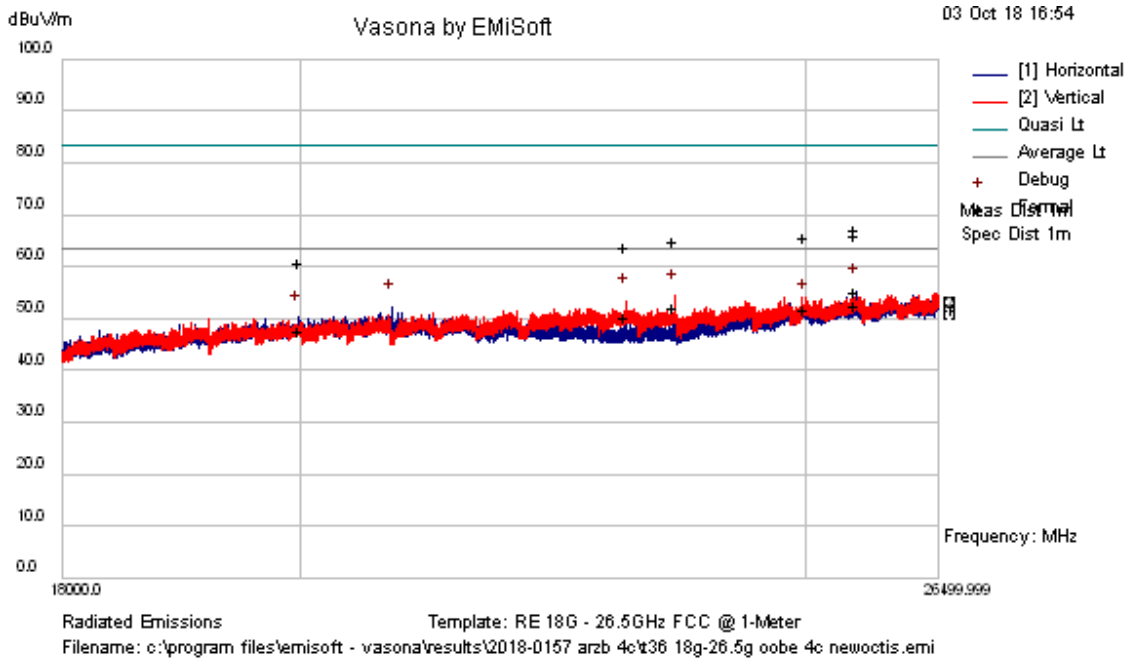
*Not in the restricted band. The signal is not related to the transmitter. Therefore, the signal is subject to Part 15 Class B limit.

PREVIEW DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
13762.9	38.76	9.01	2.24	50.01	Preview	H	102	45	54	-3.99	Pass	
14745.6	38.31	9.34	2.19	49.83	Preview	V	102	0	54	-4.17	Pass	
17031.2	34.36	10.47	4.84	49.67	Preview	H	180	90	54	-4.33	Pass	
11796.8	38.37	11.03	-0.05	49.35	Preview	H	180	0	54	-4.65	Pass	
12779.5	38.46	8.95	1.77	49.18	Preview	V	102	0	54	-4.82	Pass	
11830.6	34	11.08	-0.03	45.05	Debug	H	100	319	54	-8.95	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Spurious_TM3.2_4C_UNII-3_5745/5765/5785/5805_28.5dBm_18MHz-40GHz



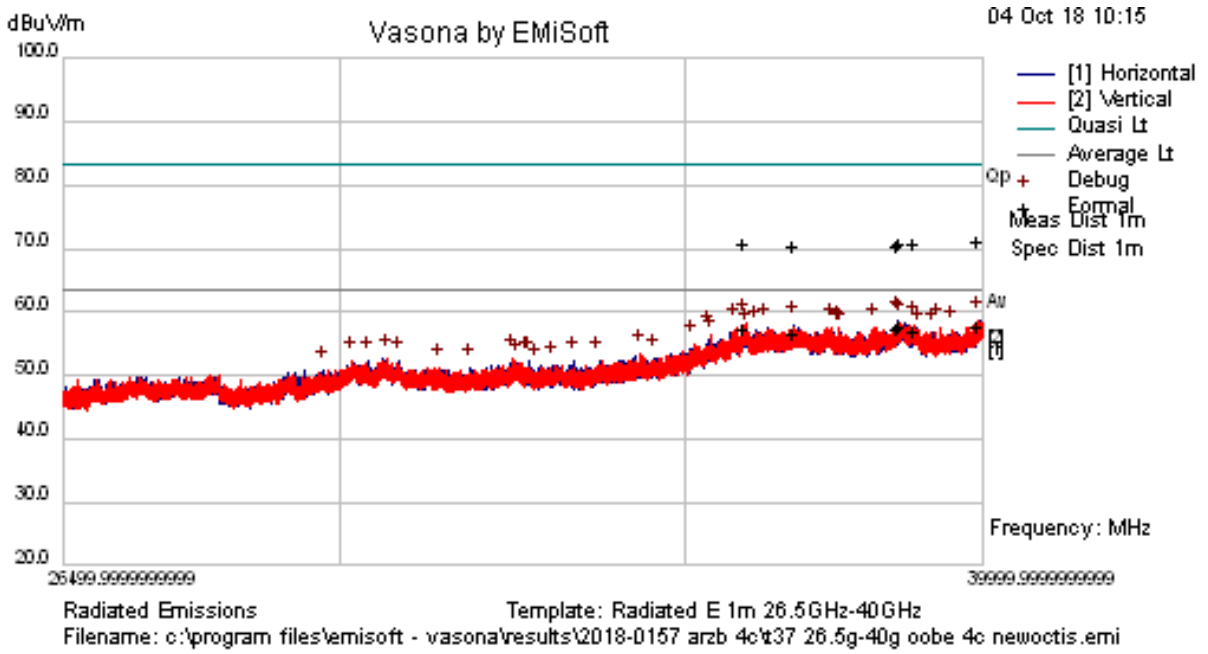
Results Title:	RE 18G - 26.5GHz FCC @ 1-Meter
File Name:	c:\program files\emisoft - vasona\results\2018-0157 ARZB 4c\t36 18g-26.5g 4c New Octis.emi
Test Laboratory:	GPCL AR9 23C, 50% 1001mB
Test Engineer:	GM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia
EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ant1-P-473121a.xo, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001, ETM 3.2, 4C/L 5745M, 5765M, 5785M, 5805M, 25.5dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE 18 GHz-26.5GHz, Horn Antenna E513, ESU-1G-EIH 69 with internal Attenuation 0dB, HP Preamp-E123, HPF E1212. Preview BW (100 kHz RBW/ 300 KHz VBW); Formal BW (1MHz RBW).
Date:	2018-10-03 16:54:26

FORMAL DATA												
Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
25559.3	25.42	9.56	15.34	50.32	Average	H	99	32	63.5	-13.18	Pass	NA
25559.3	23.09	9.56	15.34	47.99	Average	H	185	130	63.5	-15.51	Pass	NA
23592.6	23.42	9.28	14.88	47.58	Average	V	112	28	63.5	-15.92	Pass	NA
24995.6	22.53	9.48	14.94	46.95	Average	V	139	128	63.5	-16.55	Pass	NA
23081.5	21.5	9.06	15.16	45.72	Average	V	198	227	63.5	-17.78	Pass	
19997.1	20.31	8.36	14.39	43.06	Average	H	114	199	63.5	-20.44	Pass	
25559.3	37.46	9.56	15.34	62.37	Peak	H	99	32	83.5	-21.13	Pass	
25559.3	36.27	9.56	15.34	61.17	Peak	H	185	130	83.5	-22.33	Pass	

FORMAL DATA												
Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
24995.6	36.36	9.48	14.94	60.78	Peak	V	139	128	83.5	-22.72	Pass	
23592.6	36.23	9.28	14.88	60.39	Peak	V	112	28	83.5	-23.11	Pass	
23081.5	34.92	9.06	15.16	59.14	Peak	V	198	227	83.5	-24.36	Pass	
19997.1	33.37	8.36	14.39	56.12	Quasi Max	H	114	199	83.5	-27.38	Pass	

PREVIEW DATA												
Freq. (MHz)	**Raw (dBuV)**	**Cable (dB)**	**Factor (dB)**	**Level (dBuV/m)**	**Emission Type**	**Pol (H/V)**	**Ht (cm)**	**Az (deg)**	**Limit (dBuV/m)**	**Margin (dB)**	**Pass /Fail**	**Comments**
25559.3	30.37	9.56	15.34	55.27	Preview	H	100	44	63.5	-8.23	Pass	
23593.1	30.2	9.28	14.88	54.36	Preview	V	100	0	63.5	-9.14	Pass	
23081.5	29.09	9.06	15.16	53.31	Preview	V	150	264	63.5	-10.19	Pass	
24995.6	27.81	9.48	14.94	52.23	Debug	V	99	355	63.5	-11.27	Pass	
20819.7	28.89	8.77	14.56	52.22	Preview	H	100	22	63.5	-11.28	Pass	
19971.9	27.51	8.35	14.4	50.26	Debug	H	99	355	63.5	-13.24	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.



Results Title:	Radiated E 1m 26.5GHz-40GHz
File Name:	c:\program files\emisoft - vasona\results\2018-0157 arzb 4c\t37 26.5g-40g oobe 4c newoctis.emi
Test Laboratory:	GPCL AR9 23C, 50% 1001mB
Test Engineer:	MJS / GM
Test Software:	Vasona by EMISoft, version 2.161
Equipment:	Nokia

EUT Details:	AZRB + FA2RA Omni Antenna 1, NEW AZRB P/N 474510A.101, S/N 1M181320011, PSU PN-474130A.102, SNU717600016, Ant1-P-473121a.xo, SNP8182400001, Ant2-P-473121A.XO, SNP8182400001, ETM 3.2, 4C/L 5745M, 5765M, 5785M, 5805M, 25.5dBm, New Unit with PS from model one with New Octis Connector.
Configuration:	Powered by 120VAC / 60Hz, RE 26.5GHz-40 GHz, Horn Antenna E526 with preamp and cable set, ESU-1G-EIH 69 with internal Attenuation 10dB, Preview BW (100 kHz RBW/ 300 KHz VBW); Formal BW (1MHz RBW).
Date:	2018-10-04 10:15:41

FORMAL DATA

Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
38555.3	26.91	0	27.55	54.46	Average	V	175	1	63.5	-9.04	Pass	NA
39919	26.15	0	28.27	54.42	Average	V	154	122	63.5	-9.08	Pass	
35973.4	26.8	0	27.28	54.09	Average	H	113	323	63.5	-9.41	Pass	NA
38514.8	26.49	0	27.59	54.08	Average	H	202	320	63.5	-9.42	Pass	NA
38809.8	26.56	0	27.34	53.9	Average	V	161	135	63.5	-9.6	Pass	
36763.3	25.09	0	28.48	53.56	Average	H	167	93	63.5	-9.94	Pass	NA
39919	39.67	0	28.27	67.94	Peak	V	154	122	77.7	-9.76	Pass	
38555.3	40.28	0	27.55	67.83	Peak	V	175	1	77.7	-9.87	Pass	
35973.4	40.48	0	27.28	67.77	Peak	H	113	323	77.7	-9.93	Pass	
38809.8	40.18	0	27.34	67.52	Peak	V	161	135	77.7	-10.18	Pass	
38514.8	39.85	0	27.59	67.44	Peak	H	202	320	77.7	-10.26	Pass	
36763.3	38.95	0	28.48	67.43	Peak	H	167	93	77.7	-10.27	Pass	

PREVIEW DATA

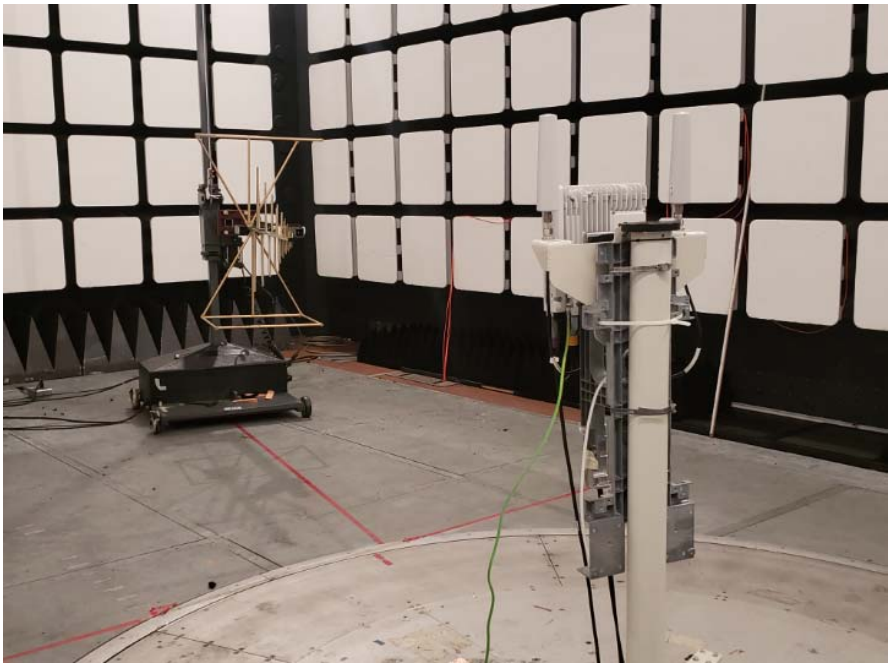
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
38514.8	31.09	0	27.59	58.68	Preview	H	200	154	63.5	-4.82	Pass	
39919	30.39	0	28.27	58.67	Preview	V	125	22	63.5	-4.83	Pass	
38555.3	30.87	0	27.55	58.42	Preview	V	100	132	63.5	-5.08	Pass	
35973.4	31.07	0	27.28	58.35	Debug	H	200	352	63.5	-5.15	Pass	
38809.8	30.73	0	27.34	58.07	Preview	V	150	44	63.5	-5.43	Pass	
36763.3	29.27	0	28.48	57.75	Preview	H	175	0	63.5	-5.75	Pass	
35818.5	30.6	0	26.9	57.5	Preview	V	150	242	63.5	-6	Pass	
39240.5	30.25	0	27.23	57.49	Preview	V	150	110	63.5	-6.01	Pass	
37382.9	29.01	0	28.45	57.47	Preview	V	175	66	63.5	-6.03	Pass	
36311.5	29.53	0	27.87	57.4	Preview	H	125	132	63.5	-6.1	Pass	
38095.7	29.39	0	28	57.39	Preview	V	125	330	63.5	-6.11	Pass	
37514.7	29	0	28.36	57.36	Preview	V	175	242	63.5	-6.14	Pass	
36147.6	29.58	0	27.6	57.18	Preview	H	200	132	63.5	-6.32	Pass	
39472.5	29.85	0	27.28	57.14	Preview	H	200	352	63.5	-6.36	Pass	
37530.1	28.62	0	28.35	56.97	Preview	H	175	22	63.5	-6.53	Pass	
35996.5	29.55	0	27.34	56.9	Preview	V	150	198	63.5	-6.6	Pass	
38883.1	29.57	0	27.28	56.85	Preview	V	150	66	63.5	-6.65	Pass	
39119.6	29.59	0	27.21	56.79	Preview	H	200	198	63.5	-6.71	Pass	
37562.3	28.36	0	28.34	56.7	Preview	H	100	308	63.5	-6.8	Pass	
35409.7	30.29	0	25.97	56.25	Preview	V	100	308	63.5	-7.25	Pass	
35421.9	29.82	0	25.99	55.8	Preview	H	200	308	63.5	-7.7	Pass	
35146.2	29.47	0	25.55	55.02	Preview	H	200	88	63.5	-8.48	Pass	

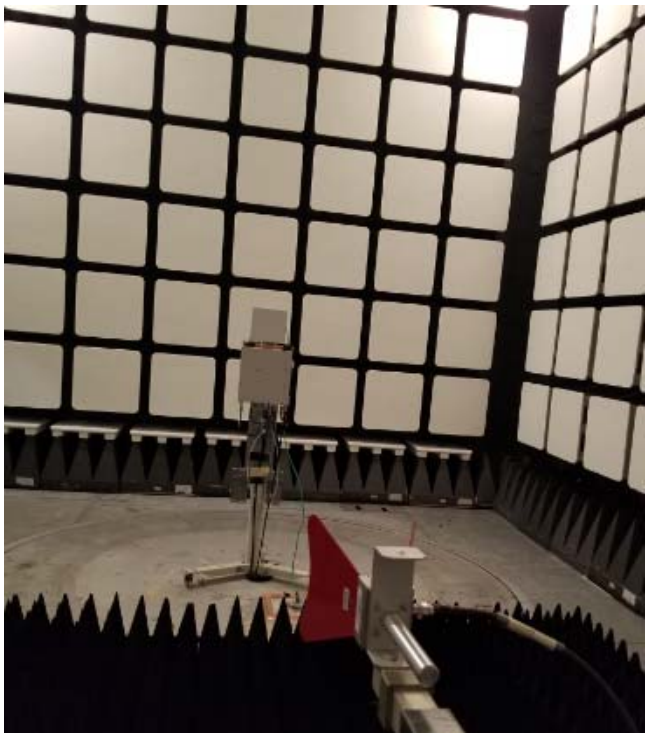
PREVIEW DATA

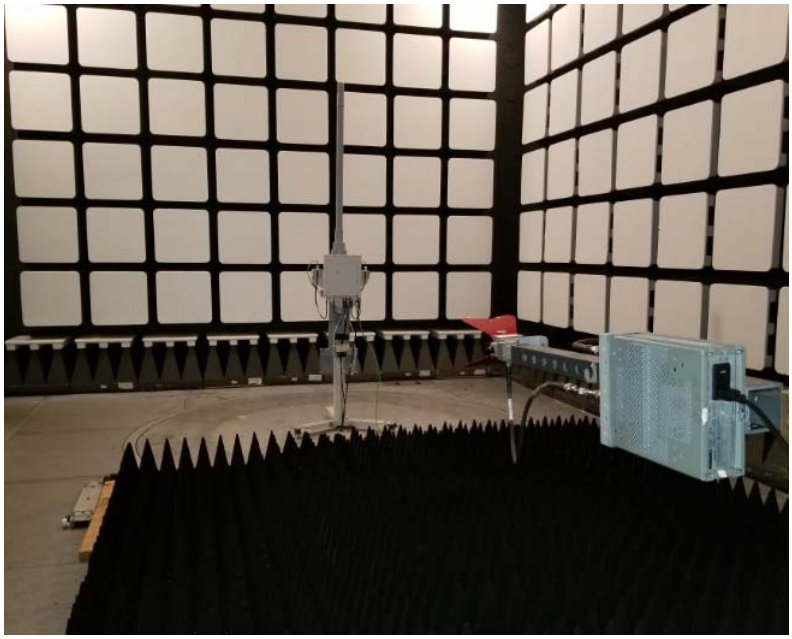
Freq. (MHz)	Raw (dBuV)	Cable (dB)	Factor (dB)	Level (dBuV/m)	Emission Type	Pol (H/V)	Ht (cm)	Az (deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail	Comments
34304.2	28.77	0	24.64	53.41	Preview	V	100	154	63.5	-10.09	Pass	
30629	29.88	0	22.94	52.83	Preview	H	200	132	63.5	-10.67	Pass	
34547.8	27.98	0	24.78	52.75	Preview	H	125	286	63.5	-10.75	Pass	
32417.8	28.71	0	24	52.71	Preview	V	150	220	63.5	-10.79	Pass	
30644.4	29.65	0	22.94	52.6	Preview	V	100	154	63.5	-10.9	Pass	
30162.4	29.69	0	22.82	52.5	Preview	V	175	154	63.5	-11	Pass	
32656.9	28.3	0	24.06	52.36	Preview	H	200	352	63.5	-11.14	Pass	
33680.1	28.03	0	24.28	52.31	Preview	H	100	176	63.5	-11.19	Pass	
32628.6	28.17	0	24.05	52.22	Preview	H	175	0	63.5	-11.28	Pass	
30794.8	29.27	0	22.93	52.2	Preview	H	200	352	63.5	-11.3	Pass	
30373.8	29.27	0	22.9	52.17	Preview	H	200	110	63.5	-11.33	Pass	
33321.5	27.99	0	24.15	52.14	Preview	H	175	198	63.5	-11.36	Pass	
32496.8	27.89	0	24.01	51.9	Preview	V	100	286	63.5	-11.6	Pass	
32989.8	27.6	0	24.16	51.75	Preview	H	125	154	63.5	-11.75	Pass	
32773.2	27.22	0	24.09	51.31	Preview	H	175	132	63.5	-12.19	Pass	
31361.1	28.08	0	23.15	51.23	Preview	V	200	0	63.5	-12.27	Pass	
31786.6	27.58	0	23.64	51.22	Preview	H	175	154	63.5	-12.28	Pass	
29772.2	28.52	0	22.44	50.95	Preview	H	150	176	63.5	-12.55	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

Photographs







Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Last Calibration Date	Calibration Due	Calibration Type
E526	A.H. Systems Inc.	Horn Antenna	Ridged Horn 26.5 GHz - 40 GHz	SAS-200/573	137	2017-10-04	2019-10-04	Requires Calibration
E513	EMC Test Systems	Horn Antenna	Double Ridged Horn 18-40 GHz	3116	2539	2017-06-16	2019-09-16	Requires Calibration
E433	EMCO	Horn Antenna	Double Ridged Horn 1-18 Ghz	3115	9909-5914	2019-05-03	2021-05-03	Requires Calibration
E1073	ETS Lindgren	Horn Antenna	Double-Ridged Waveguide Horn 1-18 GHz	3117	00135198	2017-06-09	2019-09-09	Requires Calibration
E1074	ETS Lindgren	Horn Antenna	Double-Ridged Waveguide Horn 1-18 GHz	3117	00135194	2019-05-01	2021-05-01	Requires Calibration
E393	EMCO	Horn Antenna	Double Ridged Horn 1-18 Ghz	3115	9903-5769	2017-06-05	2019-09-05	Requires Calibration
E051	EMCO	Biconical Antenna		3109	2187	2019-04-29	2021-04-29	Requires Calibration
E602	A.H. Systems Inc.	Bilogical Antenna	25 - 2000 MHz	SAS-521-2	410	2019-02-11	2021-02-11	Requires Calibration
E061	EMCO	Log Periodic Antenna		3146	2082	2019-06-25	2021-06-25	Requires Calibration
E936	Rohde & Schwarz	Test Receiver	EMI (20Hz to 40 GHz)-150 +30dBM	ESIB40	100119	2017-11-06	2019-11-06	Requires Calibration
E954	Rohde & Schwarz	Test Receiver	EMI 20Hz-40GHz -155dBm+30 dBm	ESU40	100246	2019-04-30	2021-04-30	Requires Calibration
E1190	Rohde & Schwarz	Test Receiver	EMI Test Receiver 20Hz-26.5GHz	ESI	832692/005	2018-03-19	2020-03-19	Requires Calibration
E447	Hewlett Packard	Pre-Amplifier	Preamplifier 1-26.5 GHz	8449B	3008A01384	2018-04-10	2020-04-10	Requires Calibration
E376	Hewlett Packard	Pre-Amplifier	Preamplifier 1-26.5 GHz	8449B	3008A01270	2019-05-01	2021-05-01	Requires Calibration
E447	Hewlett Packard	Pre-Amplifier	Preamplifier 1-26.5 GHz	8449B	3008A01384	2018-04-10	2020-04-10	Requires Calibration
E1166	Agilent Technologies	Pre-Amplifier	Pre-Amplifier 1-26.5GHz	8449B	3008A01740	2018-10-24	2020-10-24	Requires Calibration
E507	Sonoma Instrument	Amplifier	9KHz-1GHz	310	185794	2018-08-14	2020-08-14	Requires Calibration
E494	Sonoma Instrument	Amplifier	9kHz-1GHz	310N	185785	2018-01-09	2020-01-09	Requires Calibration
E1130	Weinschel	Attenuator	6dB	2/6	CD2545	2019-04-30	2021-04-30	Requires Calibration

Asset ID	Manufacturer	Type	Description	Model	Serial	Last Calibration Date	Calibration Due	Calibration Type
E1131	Weinschel	Attenuator	6dB	2-6	CD2518	2019-06-27	2021-06-27	Requires Calibration
E1132	Weinschel	Attenuator	6dB	2-6	CD2534	2019-06-28	2021-06-28	Requires Calibration
E1133	Weinschel	Attenuator	3dB	2-3	CC8591	2017-07-21	2019-09-21	Requires Calibration
E1134	Weinschel	Attenuator	3dB	2-3	CC9590	2017-06-28	2019-09-28	Requires Calibration
E177	Weinschel	Attenuator	10 dB, 18GHz 2 watt	2-10	BC0304	2018-06-26	2020-06-26	Requires Calibration
E175	Weinschel	Attenuator	3 dB, 2 Watt	2-3	BC0243	2018-05-23	2020-05-23	Requires Calibration
E176	Weinschel	Attenuator	6 dB, 2 Watt DC-12.5 GHz	2-6	BC0255	2018-06-29	2020-06-29	Requires Calibration
E1212	RLC Electronics Inc	High Pass Filter	High Pass Filter 10-30 GHz	F-19414	1444002			Calibration Not Required, Must Be Verified
E489	EMC Test Systems	Multi-Device Controller		2090	0004-1507			Calibration Not Required
E1404	EMC Test Systems	Multi-Device Controller		2090	9908-1451			Calibration Not Required
E260	EMC Test Systems	Multi-Device Controller		2090	9605-1139			Calibration Not Required
E1128	Extech	Data Logger	Barometric Humidity Temp Data Logger	SD700	Q679271	2018-09-11	2019-09-11	Requires Calibration

6. NVLAP Certificate of Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100275-0

Nokia, Global Product Compliance Lab
Murray Hill, NJ

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2018-09-05 through 2019-09-30
Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program