



TEST REPORT

Report Number. : R13585640-E3

Applicant : Nuwhirl Systems Corp.
22520 Temescal Canyon Rd, Suite B
Corona, CA, 92883, USA

Model : MBC-298

FCC ID : 2AYRY-MBC-298

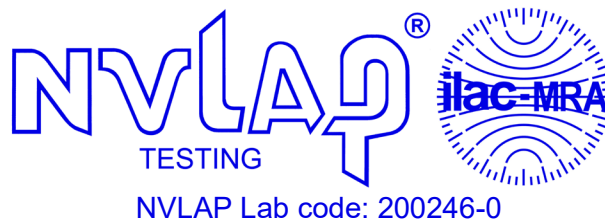
IC : 26900-MBC298

EUT Description : Tub Controller

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C: 2020
ISED RSS-247 ISSUE 2: 2017
ISED RSS-GEN ISSUE 5 + Amendment 1: 2019

Date Of Issue:
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Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2021-03-30	Initial Issue	Haley Ackun
V2	2021-04-27	Misc. editorial updates	Mike Antola
V3	2021-05-21	Misc. editorial updates	Mike Antola

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Nuwhirl Systems Corp.
22520 Temescal Canyon Rd, Suite B
Corona, CA, 92883, USA

EUT DESCRIPTION: Tub Controller

MODEL: MBC-298

SERIAL NUMBER: Radiated Sample:C00756529
Conducted Sample:C00756533

SAMPLE RECEIPT DATE: 2020-11-30

DATE TESTED: 2021-01-04 to 2021-01-14

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2020	Complies
ISED RSS-247 Issue 2: 2017	Complies
ISED RSS-GEN Issue 5 + Amendment 1: 2019	Complies

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

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

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

Approved & Released For
UL LLC. By:



Brian T. Kiewra
Project Engineer
Consumer Technology Division
UL LLC.

Prepared By:



Haley Ackun
Laboratory Engineer
Consumer Technology Division
UL LLC.

2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment	RSS-GEN 6.7	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	RSS-247 (5.1) (b)	Hopping Frequency Separation	Complies	None.
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Number of Hopping Channels	Complies	None.
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Average Time of Occupancy	Complies	None.
15.247 (b)(1)	RSS-247 (5.4) (b)	Output Power	Complies	None.
See Comment		Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	RSS-247 (5.5)	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2020, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5+Amendment 1: 2019, and RSS-247 Issue 2: 2017.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr. Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

12 Laboratory Dr.	2800 Suite Perimeter Park Dr. Suite B
ISED Site Code: 2180C	
☐ Chamber A RTP	☐ North Chamber
☐ Chamber C RTP	☒ South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

UL LLC (RTP), CABID: US00067, is accredited by NVLAP, Laboratory Code 200246-0

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
RF output power, radiated (SAC) < 180 MHz	6.18 dB
RF output power, radiated (SAC) >= 180 MHz	3.23 dB
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a hydromassage tub controller that supports BT.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	2.11	1.63
2402 - 2480	Enhanced DQPSK	4.06	2.55
2402 - 2480	Enhanced 8PSK	4.32	2.70

Note: GFSK, DQPSK, 8PSK average power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on these modes to show compliance. For average power data please refer to section 9.7.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PCB antenna, with a maximum gain of 0 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v2.0.2.

The test hardware version used during testing was v5.1.2.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT only operates in X orientation. Therefore all final radiated testing was performed with the EUT in X orientation.

The worst-case data rates tested for BT were:

GFSK mode: DH1
DQPSK mode: 2DH1
8PSK mode: 3DH1

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	L470	PF0ZV674	NA
Laptop	Lenovo	--	PC0A2UQT	NA
Laptop Charger	Lenovo	ADLX45NDC2A	SA10E7590	NA
Laptop	HP	14-dk1003dx	5CG016B3DL	TX2-RTL8821CE
Elec. Diverter Valve X4	Touchstone	EDV310L	NA	NA
Heater Pad	NA	HS2IBS-01	MP005602	NA
Heater Pad	NA	HS2IBJ001	MP009482	NA
Speakers X2	Nuwhirl	NA	NA	NA
Thermistor	NA	NA	NA	NA
Water Detect Cable	Nuwhirl	NA	NA	NA
Display Module	Nuwhirl	NA	NA	NA
Bath Pump	Nuwhirl	PX07500SCS	072720000094	NA
Air Blower	Nuwhirl	BL120-500H000T0	092220001803	NA
ICL Light	NA	NA	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Aux	4	3-pin	I/O	<3m	These cables go to the diverter valves
2	Audio	2	Aux	I/O	<3m	Goes to the 2 speakers
3	2 -pin	2	2-pin	I/O	<3m	Goes to the Heating Pads
4	Plugs	2	3 prong plug	I/O	<3m	Air Blower and Bath Pump
5	USB	1	USB	Shielded	<3m	Goes to computer for data transfer

TEST SETUP

EUT was connected to a test laptop during tests. Test software exercised the radio card.

SETUP DIAGRAMS

Please refer to R13585640-EP1 for setup diagrams

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
T177 (PRE0079253)	Spectrum Analyzer	Agilent Technologies	E4446A	2020-04-30	2021-04-30
PWM005 (PRE0136341)	RF Power Meter	Keysight Technologies	N1912A	2020-07-14	2021-07-14
PWS005 (S/N MY55090030)	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	N1912A	2020-05-26	2021-05-26
HI0090 (PRE0191271)	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
SOFTEMI	Antenna Port Software	UL	AP2020.12.3		

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2020-03-26	2021-03-26
HI0091	Environmental Meter	Fisher Scientific	14-650-118	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2020-08-18	2021-08-18
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2020-08-18	2021-08-18
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2020-03-26	2021-03-26
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (2015-05-26)		

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	(Loop Ant.)			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	30-1000 MHz				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
	18-40 GHz				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2021-07-06
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-07	2021-07-07
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5 (2020-08-18)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22

8. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

Occupied BW (20dB): ANSI C63.10-2013 Section 6.9.2

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

Carrier Frequency Separation: ANSI C63.10-2013 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2013 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2013 Section 7.8.4

Peak Output Power: ANSI C63.10-2013 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2013 Section 7.8.8

Band-Edge: ANSI C63.10-2013 Section 7.8.6, 6.10.4 and 6.10.5

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

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

9. ANTENNA PORT TEST RESULTS

9.1. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

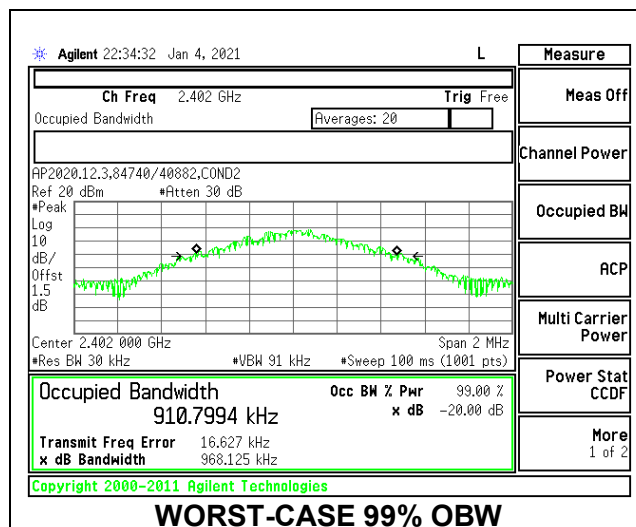
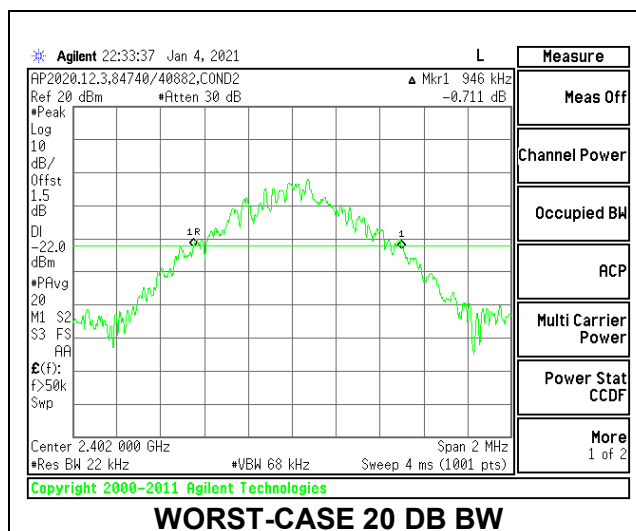
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

RESULTS

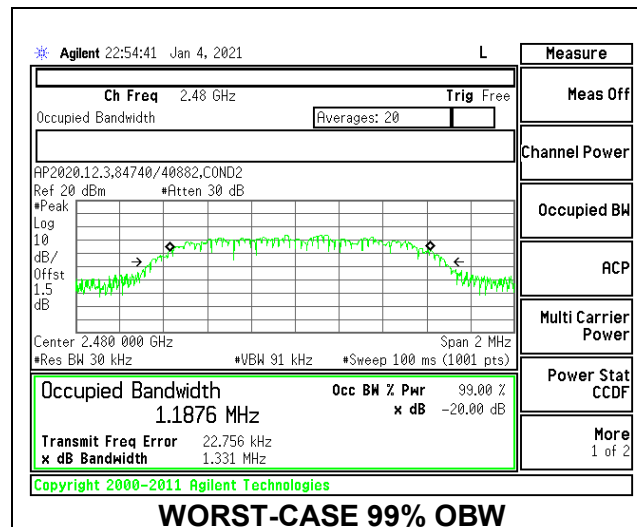
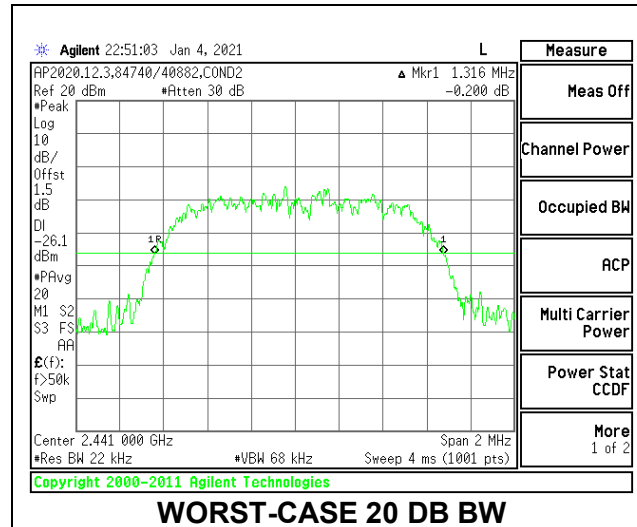
9.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.946	0.911
Mid	2441	0.964	0.914
High	2480	0.950	0.915



9.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.342	1.191
Mid	2441	1.316	1.192
High	2480	1.344	1.188



9.2. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (5.1) (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

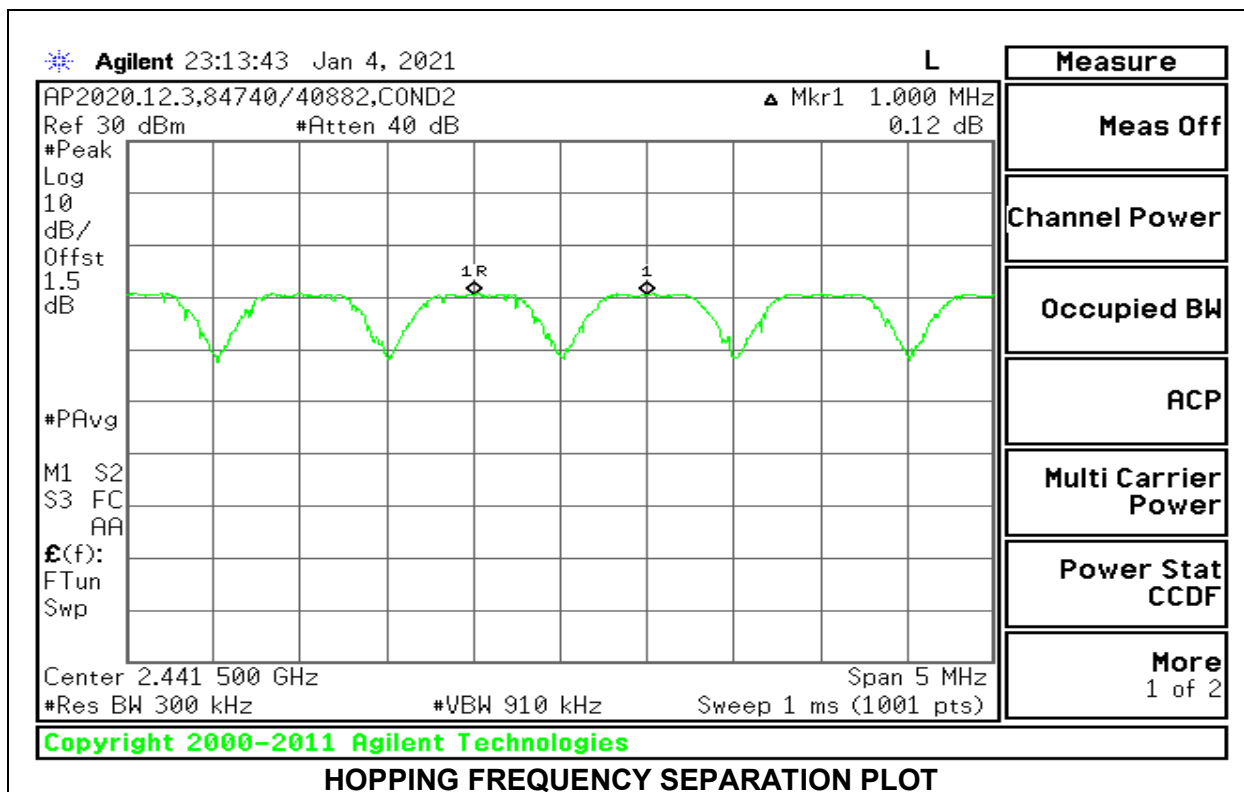
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

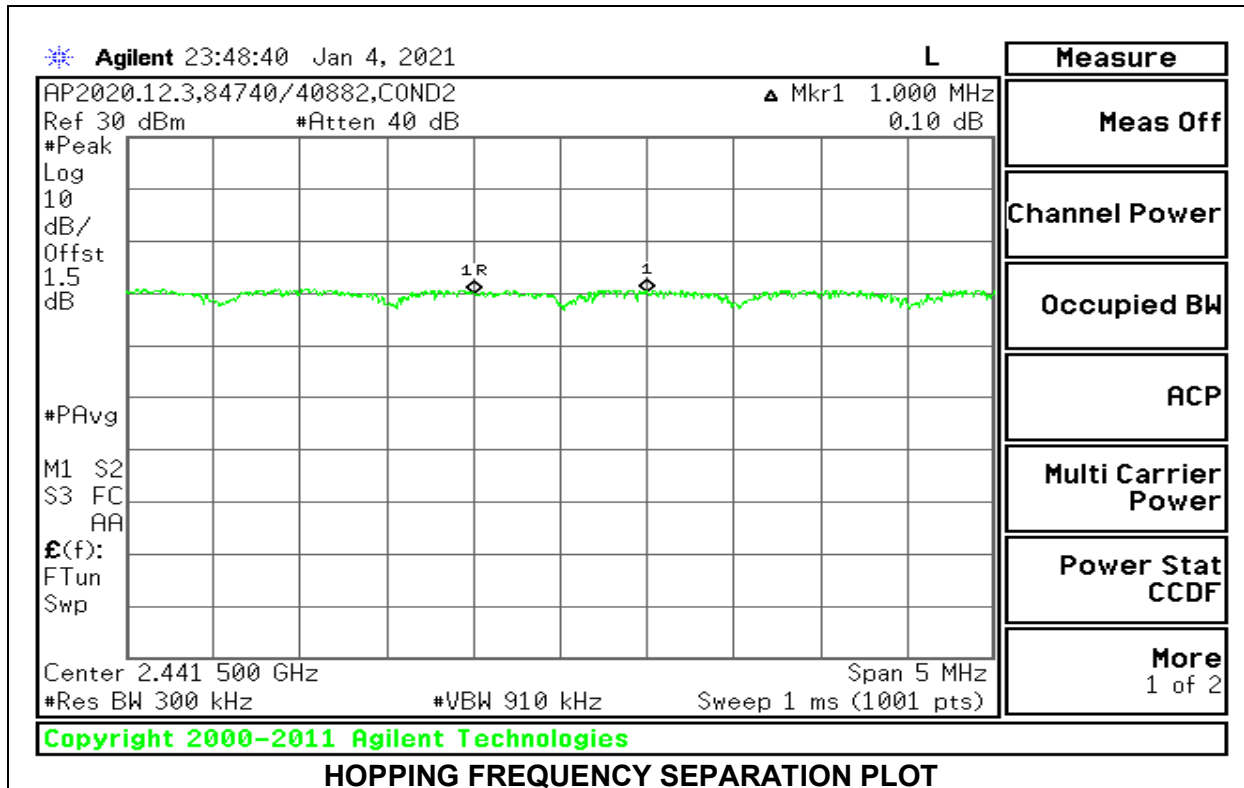
The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz (approx. 30% of channel spacing) and the VBW is set to $VBW \geq RBW$. The sweep time is coupled.

RESULTS

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



Note – The channel hopping separation of 1MHz is less than the 20 dB bandwidth (approx. 1.344 MHz). However, the output power is less than 125 mW and the channel separation is greater than 2/3 the 20 dB bandwidth (approx. 896 kHz).

Ch. A	Ch. B	Ch. 1 to Ch.2 Sep.	Max. 20 dB BW	2/3 20 dB BW	Margin
(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
2441	2442	1.000	1.344	0.896	-0.104

9.3. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (5.1) (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

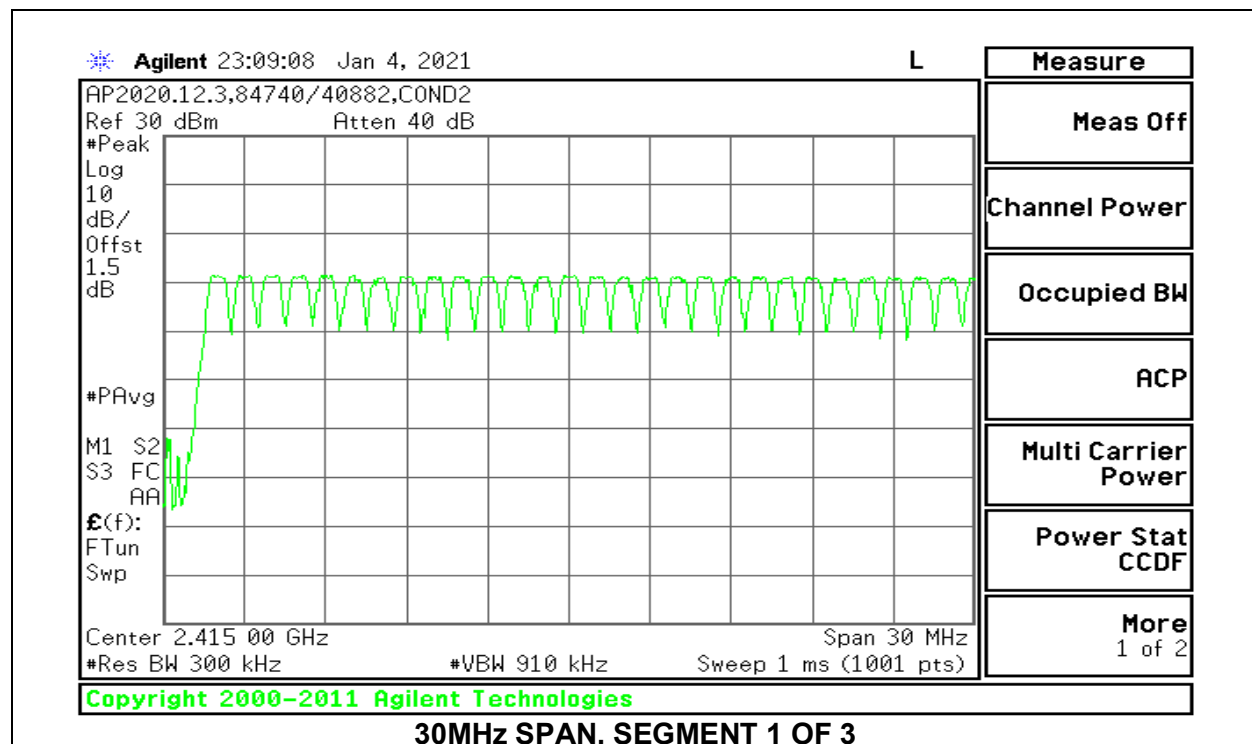
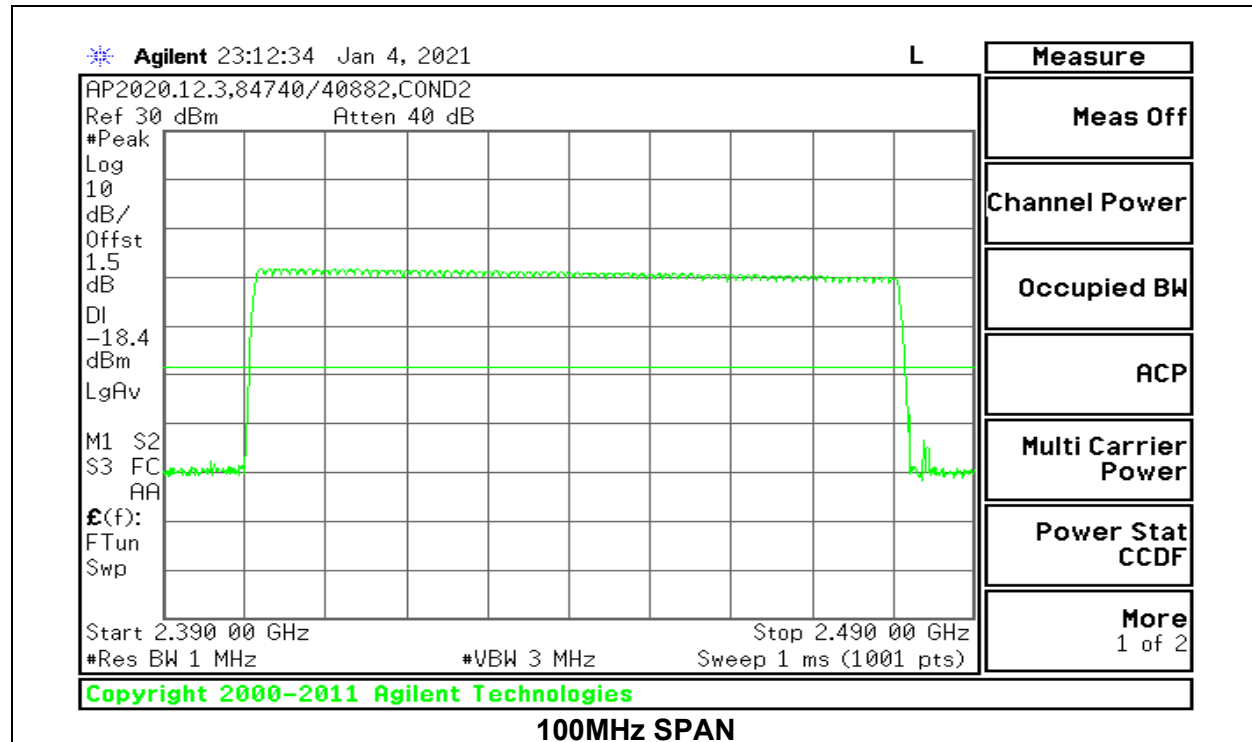
TEST PROCEDURE

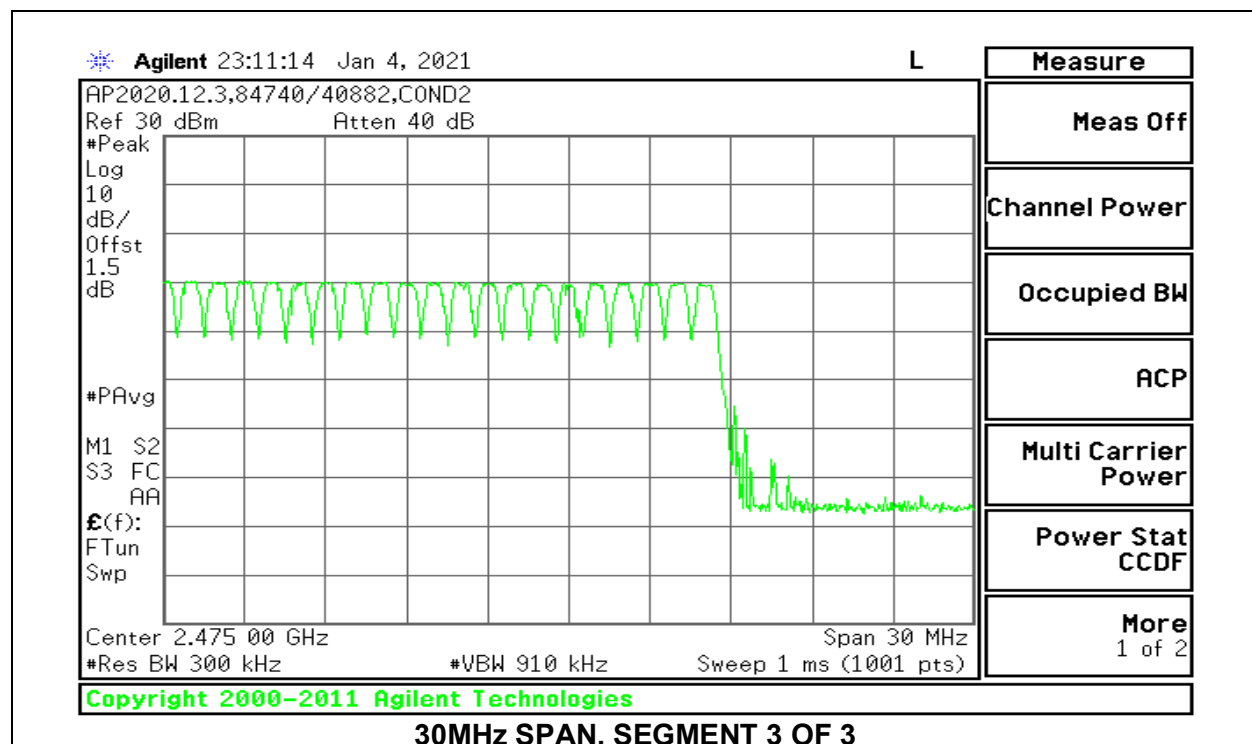
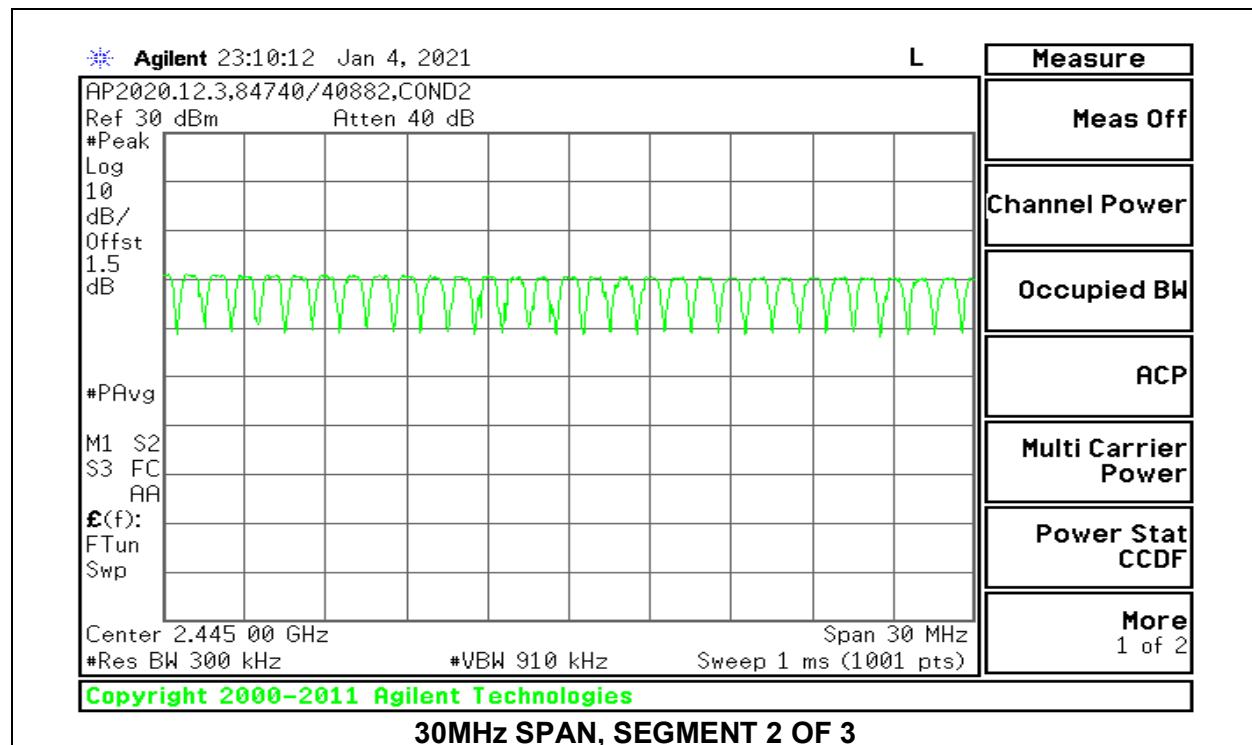
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps for visibility of the entire span. Then, smaller spans are set to more clearly identify the channels. The RBW is set to 30% of the channel spacing (approx. 300 kHz). The analyzer is set to Max Hold.

RESULTS

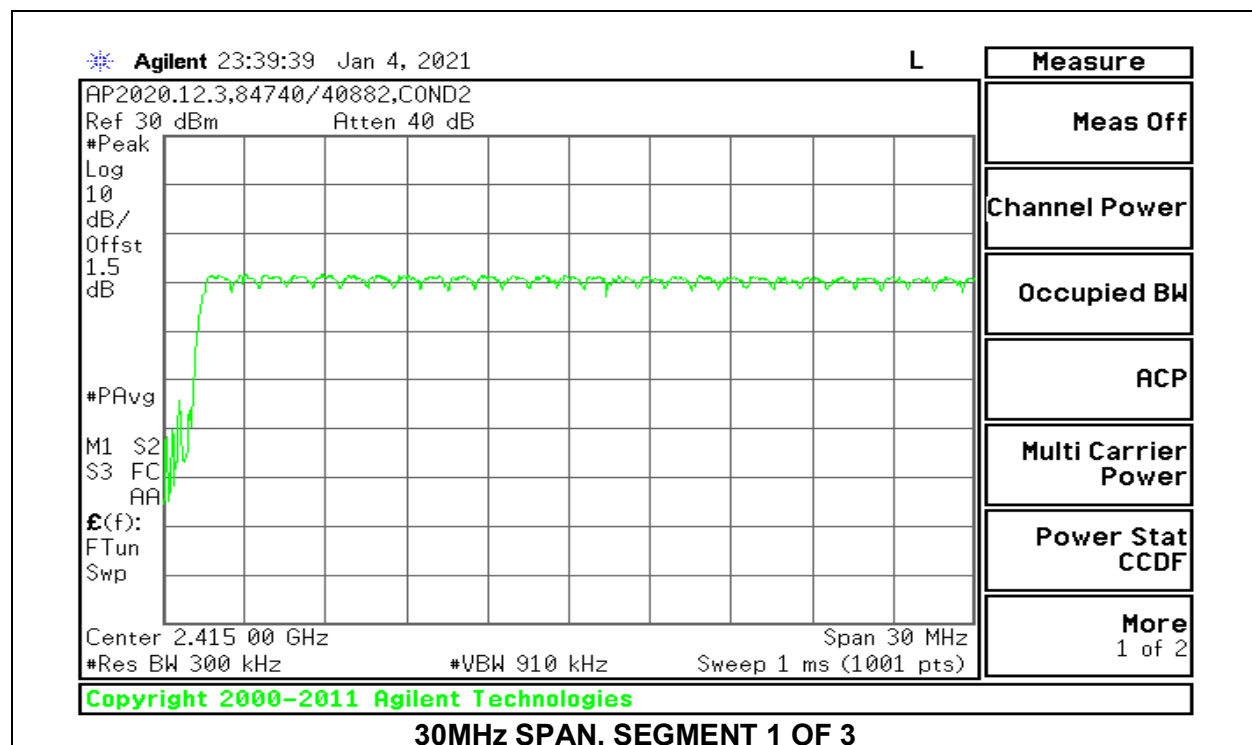
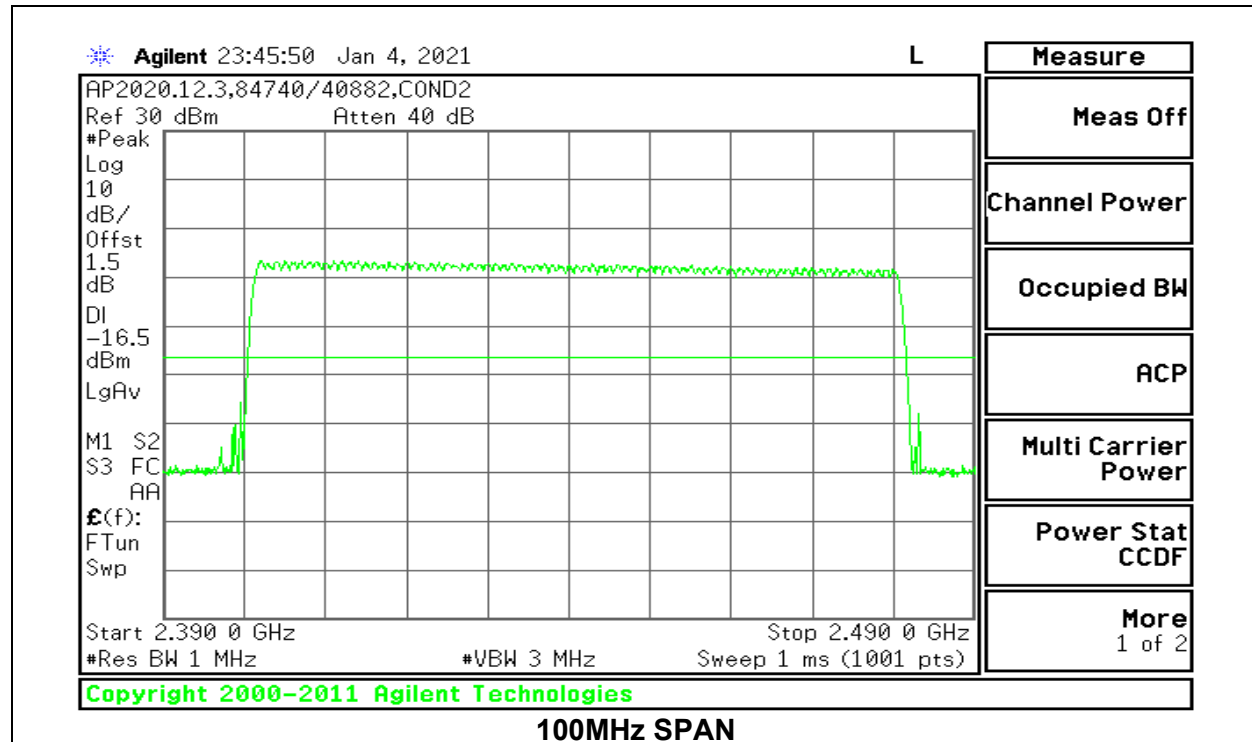
Normal Mode: All Channels Observed

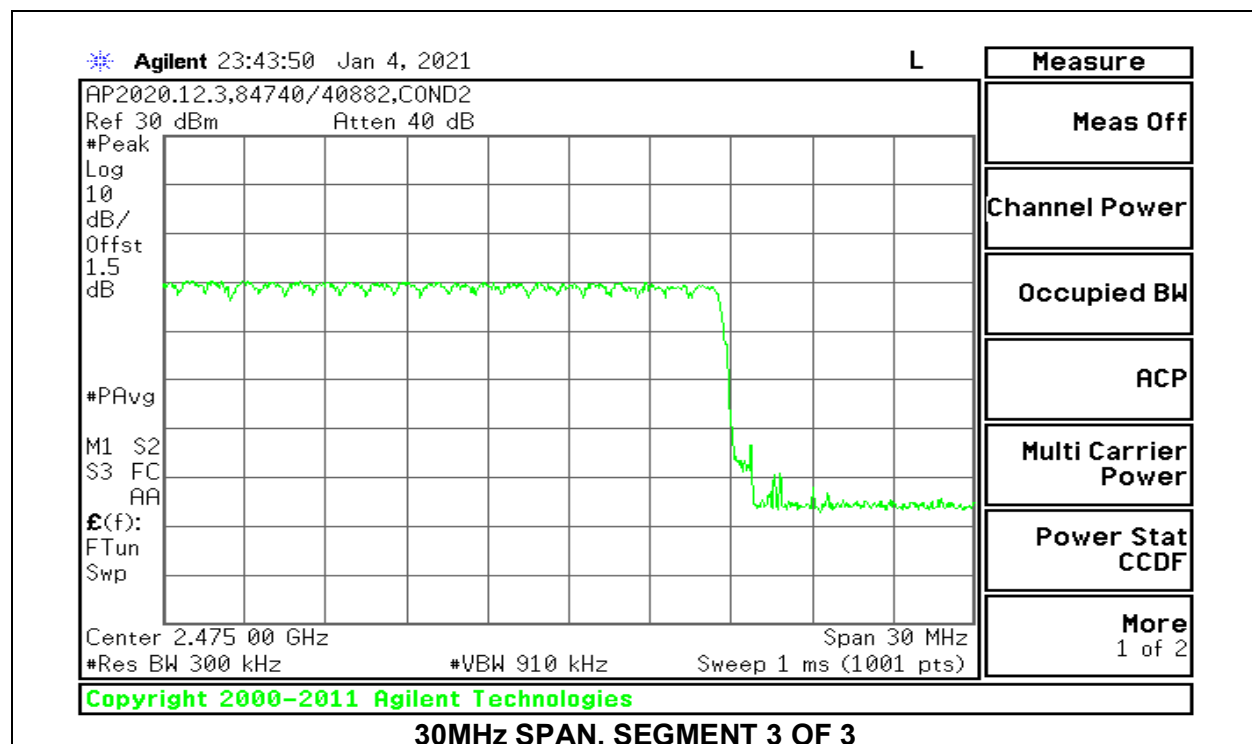
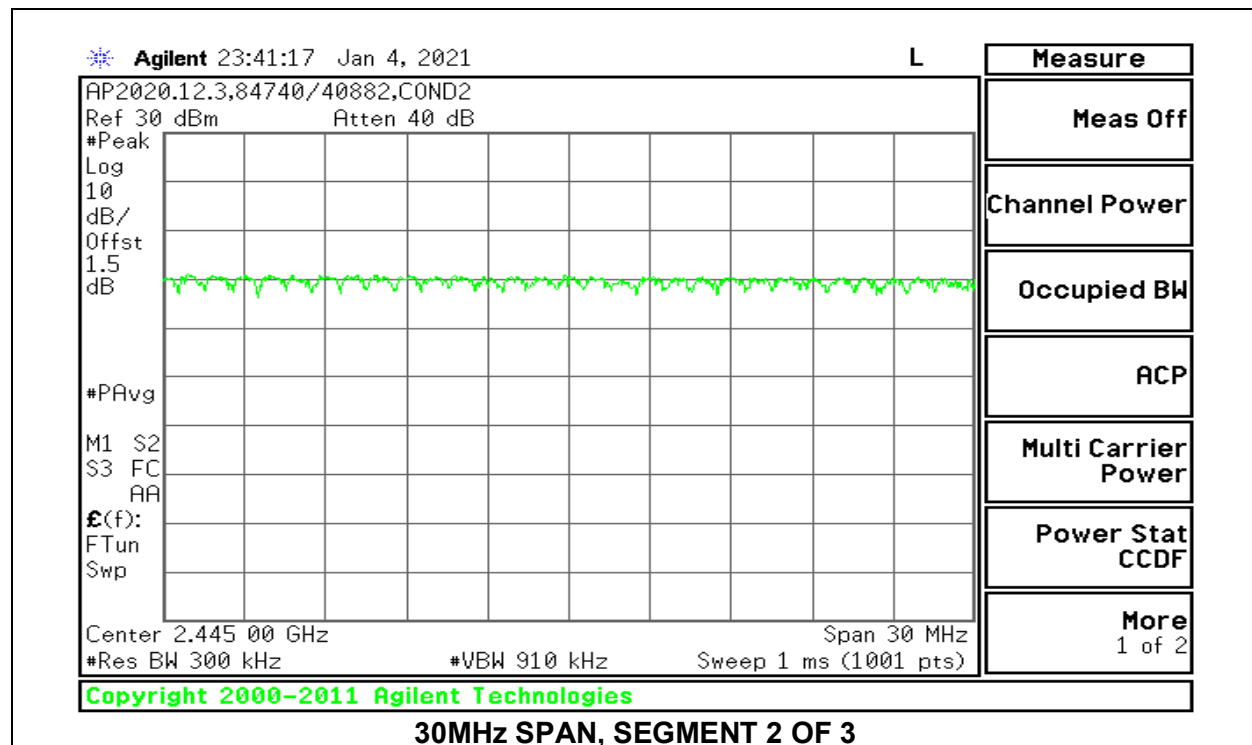
9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION





9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION





9.4. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (5.1) (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 3.16 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{pulse width}$.

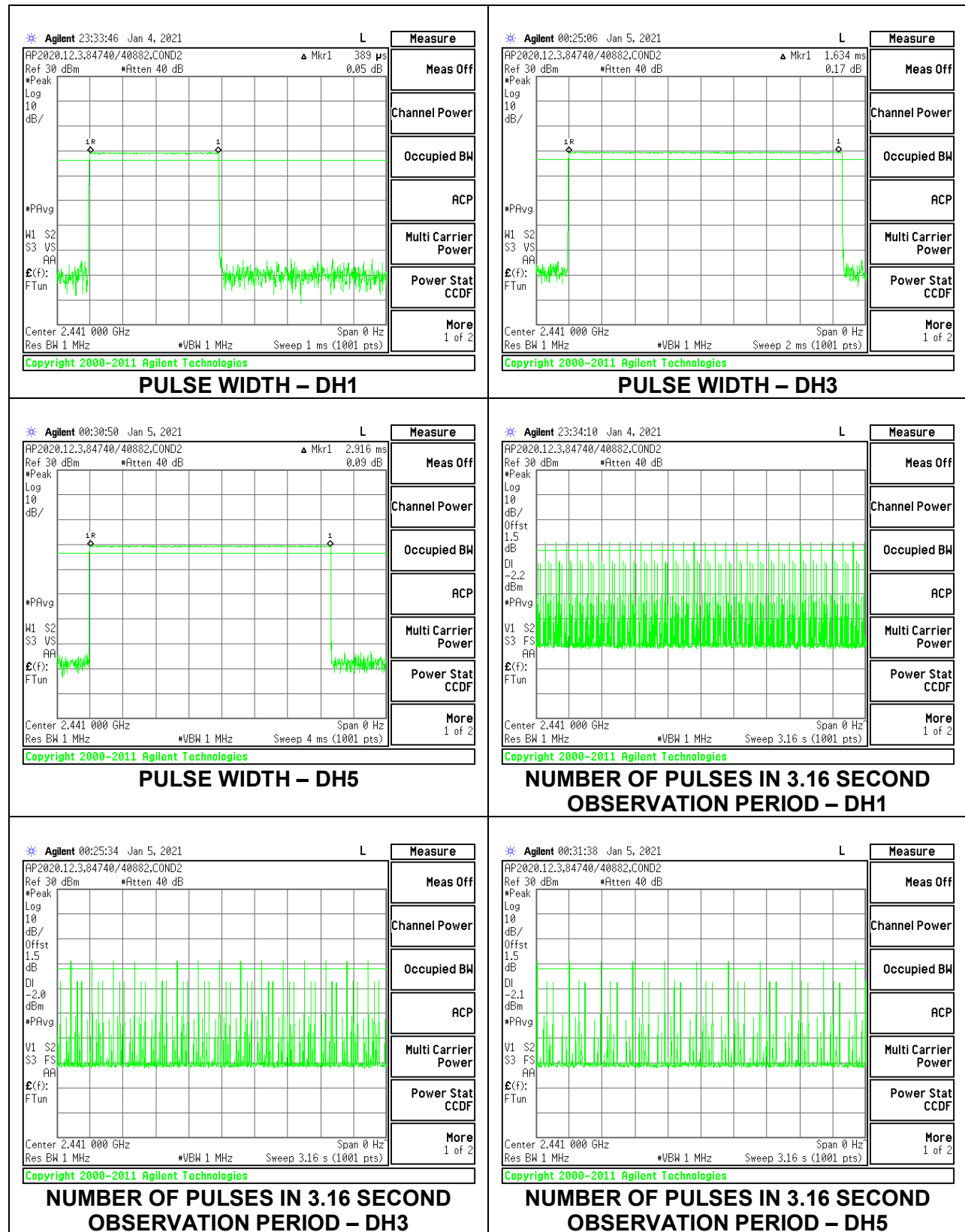
Note: Duty cycle correction factor (DCCF) was calculated based on the worst case on-time when the device transmits DH5 packets and operates on 20 channels (5/1600 s per hop = 3.125 ms per channel). This is justified as the measured pulse width is less than or equal to the theoretical. In this mode, the device will have a maximum of 2 hops on a channel in 100ms or $2 * 3.125 \text{ ms} = 6.25 \text{ ms}$ on any channel.

Therefore, $DCCF = 20 * \log(6.25 / 100) = -24\text{dB}$.

RESULTS

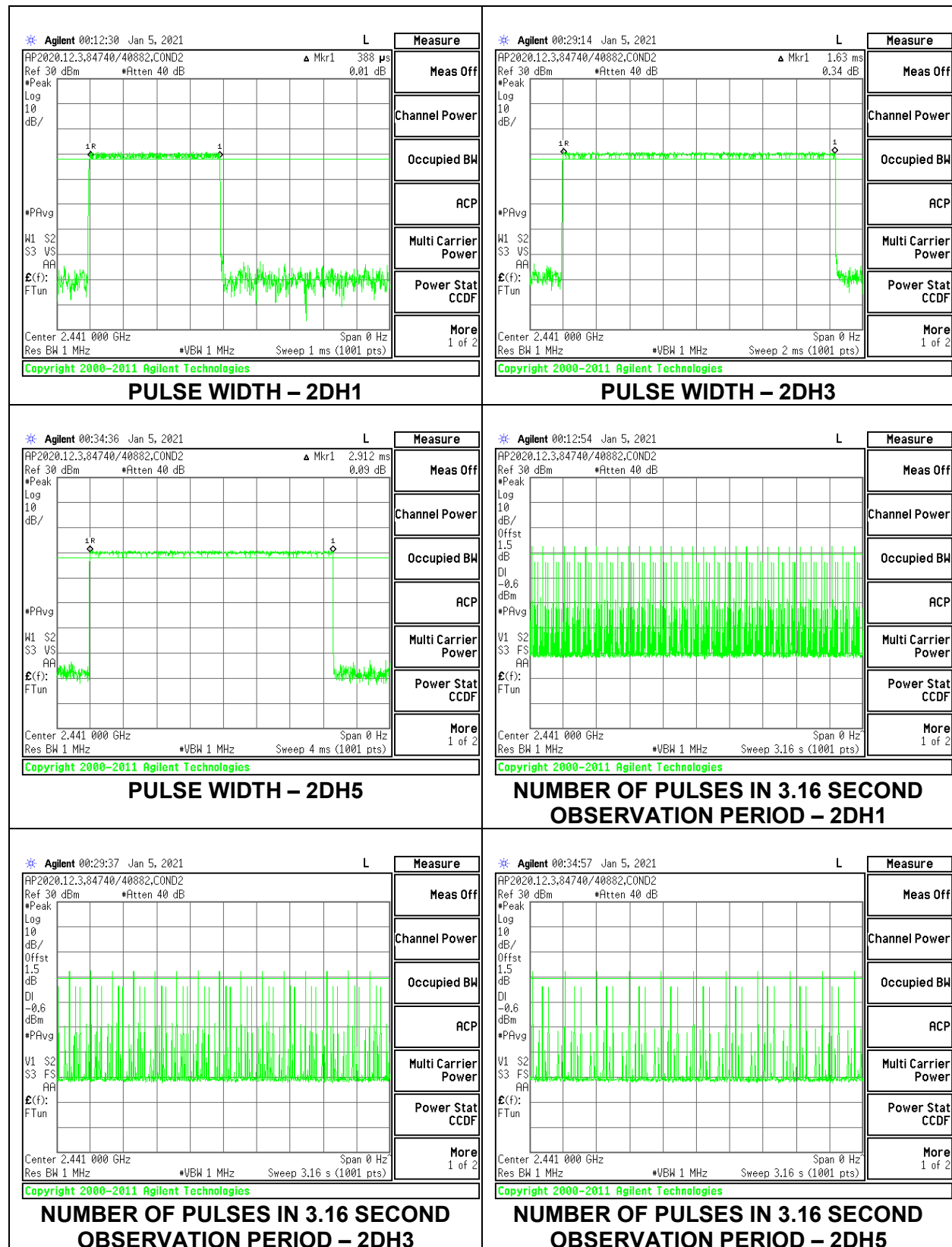
9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.389	31	0.1206	0.4	-0.2794
DH3	1.634	15	0.2451	0.4	-0.1549
DH5	2.916	11	0.3208	0.4	-0.0792
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.389	7.75	0.03015	0.4	-0.3699
DH3	1.634	3.75	0.06128	0.4	-0.3387
DH5	2.916	2.75	0.08019	0.4	-0.3198



9.4.2. BLUETOOTH BASIC DATA RATE DQPSK MODULATION

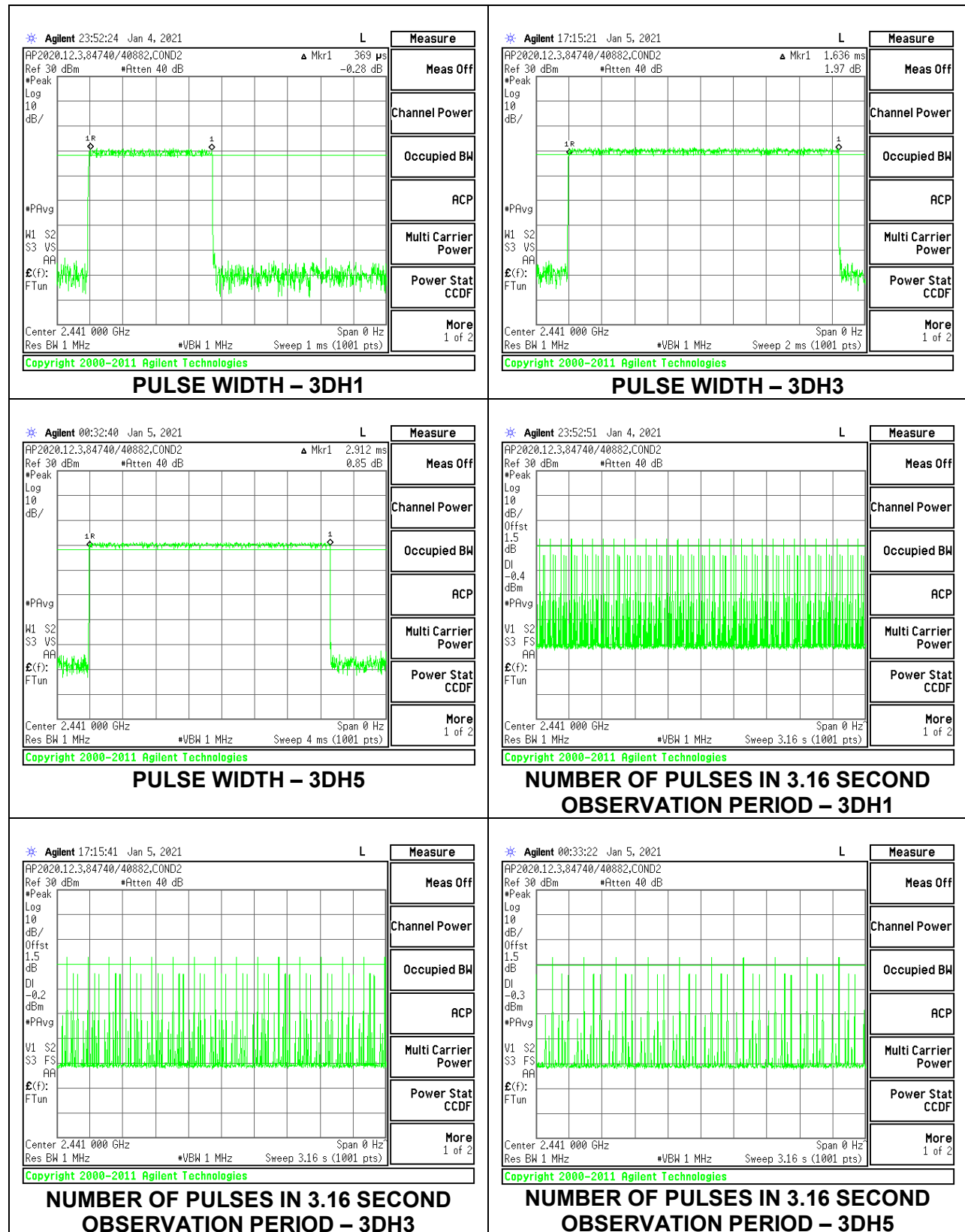
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DQPSK Normal Mode					
2DH1	0.388	31	0.1203	0.4	-0.2797
2DH3	1.630	15	0.2445	0.4	-0.1555
2DH5	2.912	11	0.3203	0.4	-0.0797



9.4.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3DH1	0.369	31	0.11439	0.4	-0.28561
3DH3	1.636	16	0.26176	0.4	-0.13824
3DH5	2.912	10	0.2912	0.4	-0.1088

Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.



9.5. OUTPUT POWER

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

TEST PROCEDURE

Measurements performed using a wideband peak power sensor and power meter for a peak power measurement.

The cable insertion loss of 1.50 dB was entered as an offset in the power meter.

RESULTS

9.5.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Date:	2021-01-04
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Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	2.11	30	-27.89
Middle	2441	0.79	30	-29.21
High	2480	-0.31	30	-30.31

9.5.2. BLUETOOTH BASIC DATA RATE DQPSK MODULATION

Tested By:	84740/40882
Date:	2021-01-04

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.06	30	-25.94
Middle	2441	3.06	30	-26.94
High	2480	1.97	30	-28.03

9.5.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	84740/40882
Date:	2021-01-04

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.32	21	-16.68
Middle	2441	3.37	21	-17.63
High	2480	2.36	21	-18.64

9.6. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements performed using a wideband average power sensor and power meter for a gated average power measurement.

The cable insertion loss of 1.50 dB was entered as an offset in the power meter.

RESULTS

9.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	84740/40882
Date	2021-01-04

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.72
Middle	2441	0.55
High	2480	-0.69

9.6.2. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	84740/40882
Date	2021-01-04

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.59
Middle	2441	0.52
High	2480	-0.69

9.6.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	84740/40882
Date	2021-01-04

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.5
Middle	2441	0.48
High	2480	-0.64

9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

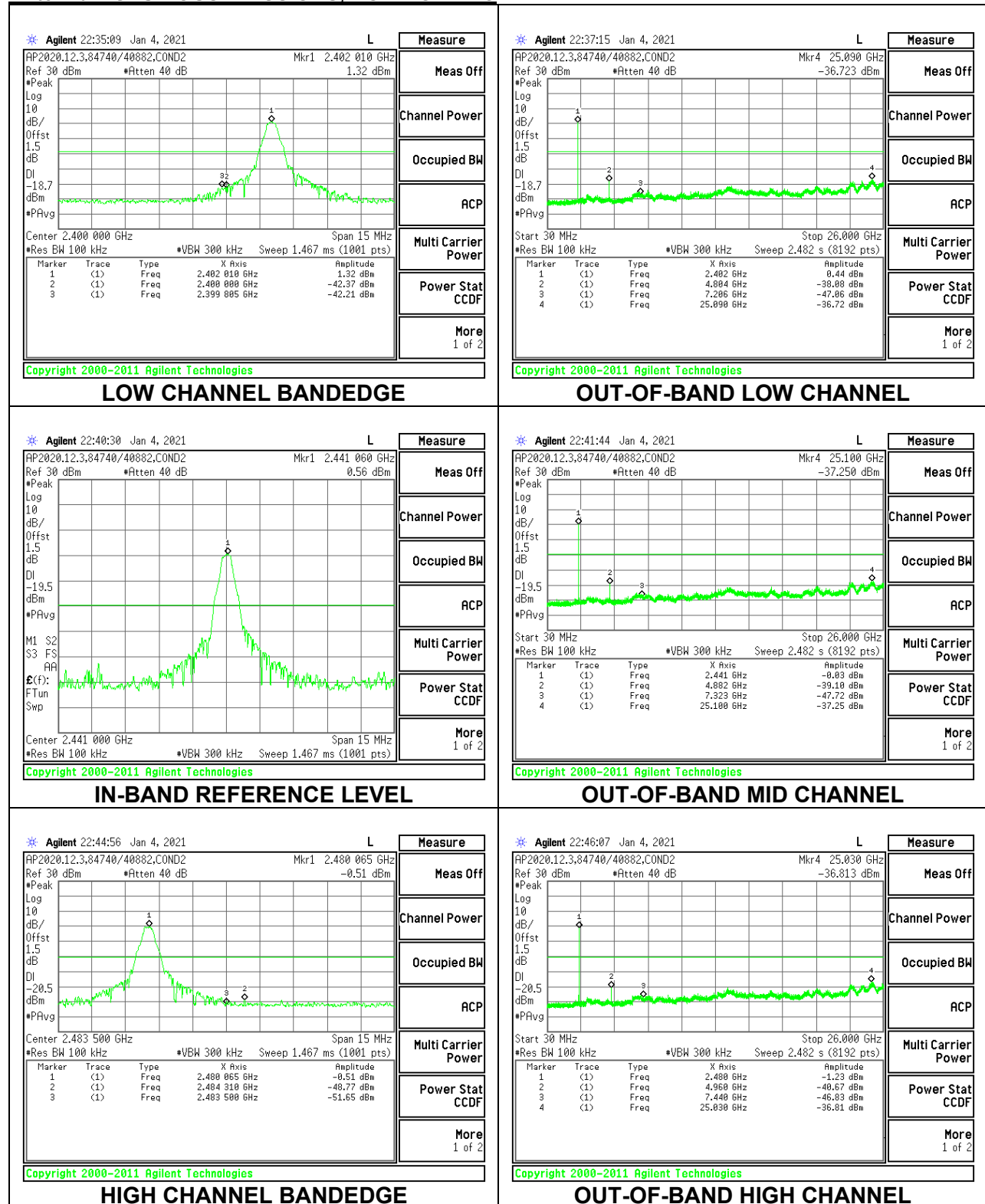
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

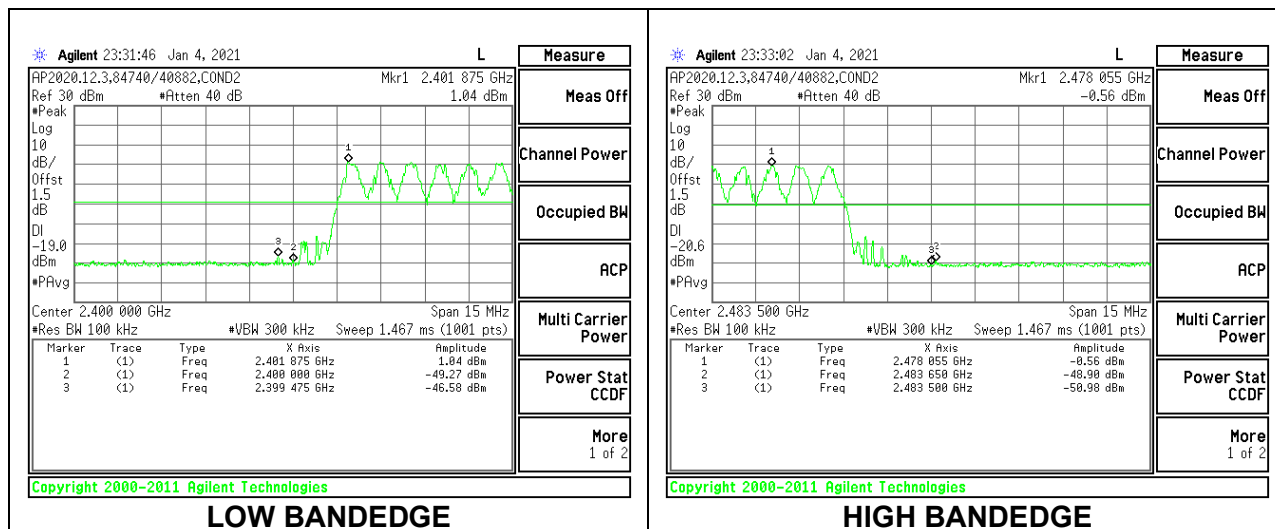
RESULTS

9.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1 SPURIOUS EMISSIONS, NON-HOPPING

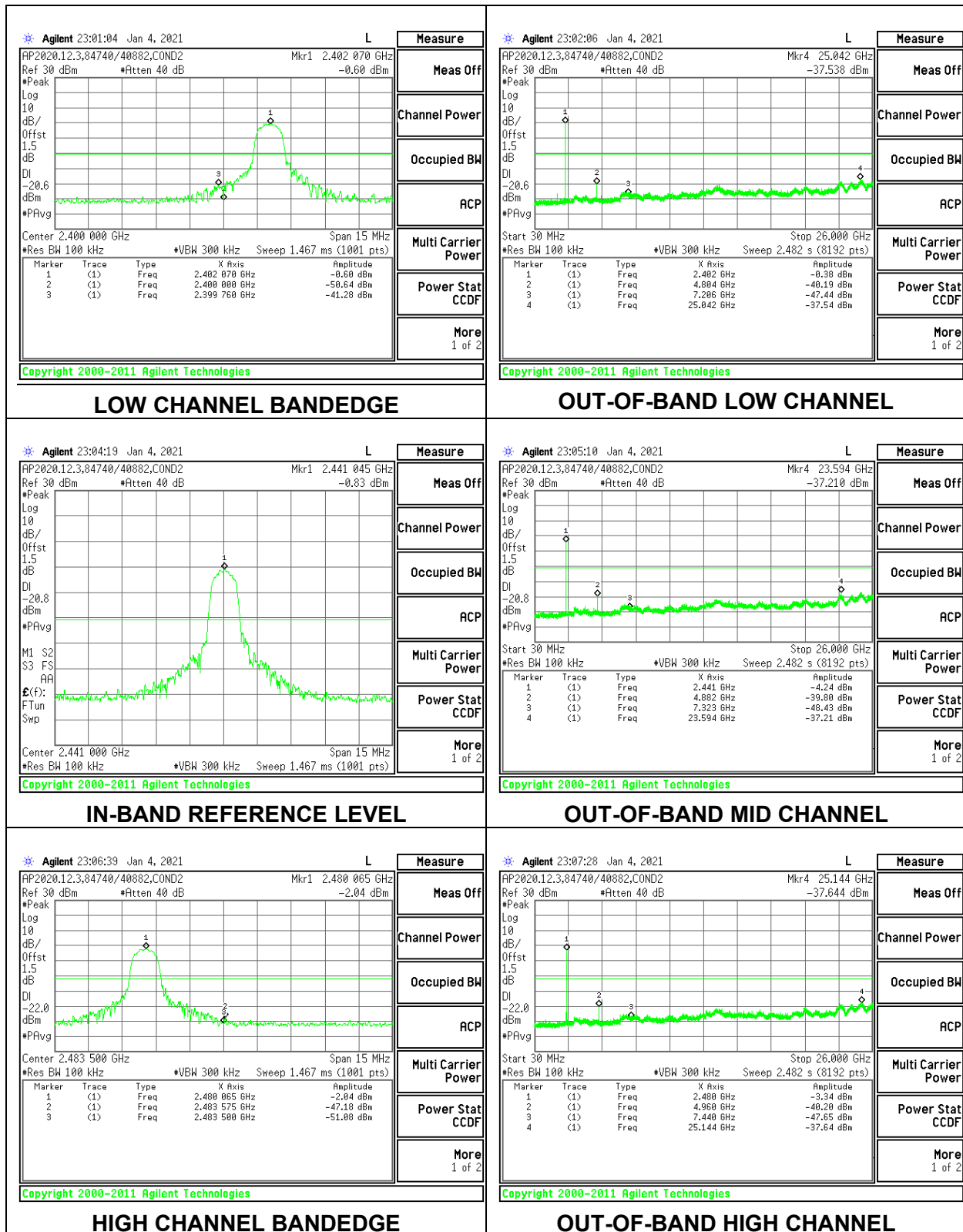


Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

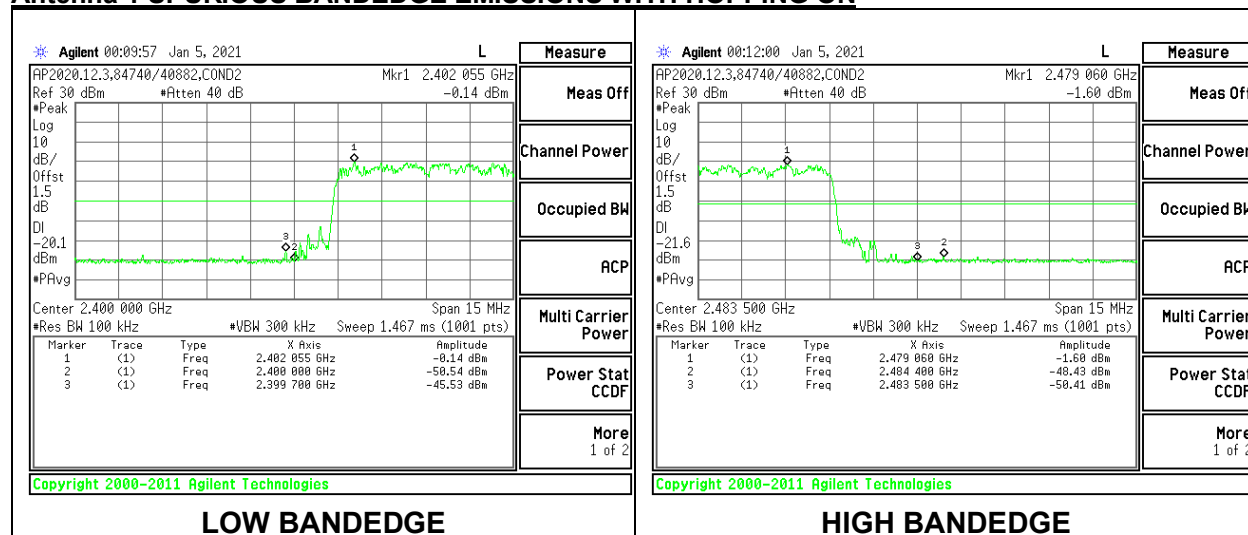


9.7.2. BLUETOOTH BASIC DATA RATE DQPSK MODULATION

Antenna 1 SPURIOUS EMISSIONS, NON-HOPPING

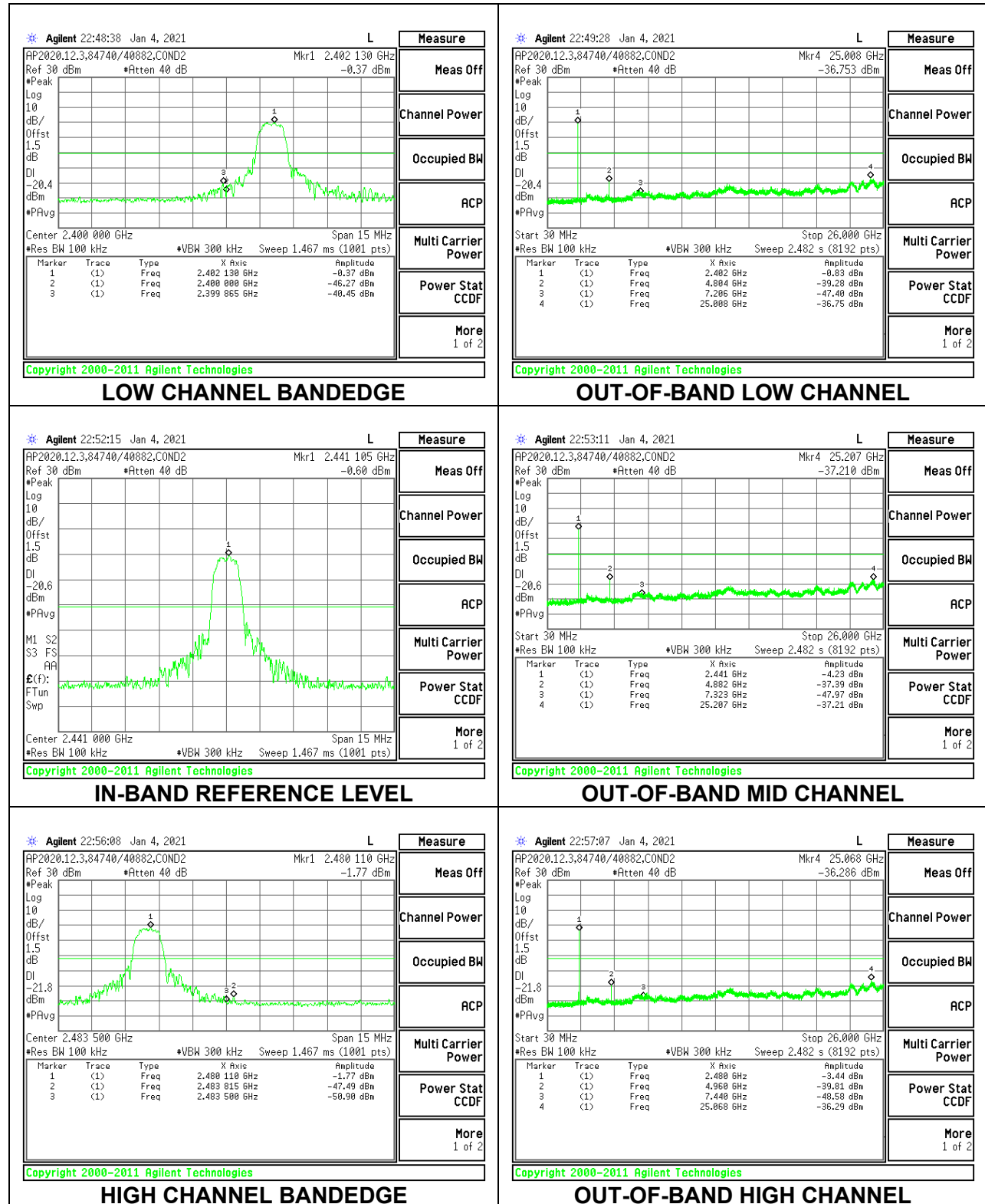


Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

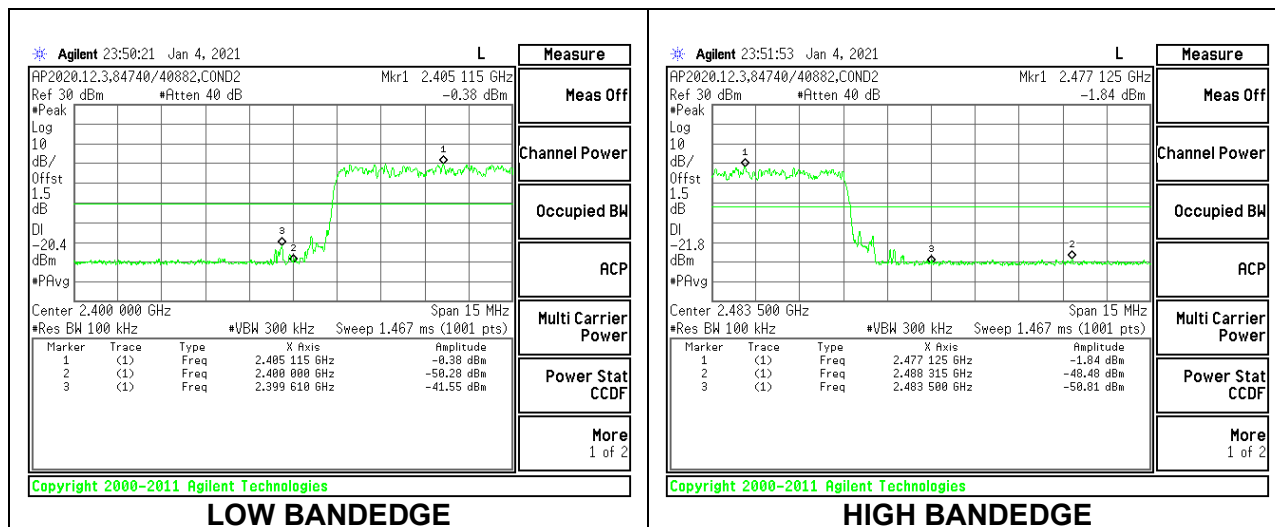


9.7.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1 SPURIOUS EMISSIONS, NON-HOPPING



Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

TEST PROCEDURE

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

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

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

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

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

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

KDB 558074 D01 15.247 Meas Guidance v05r02

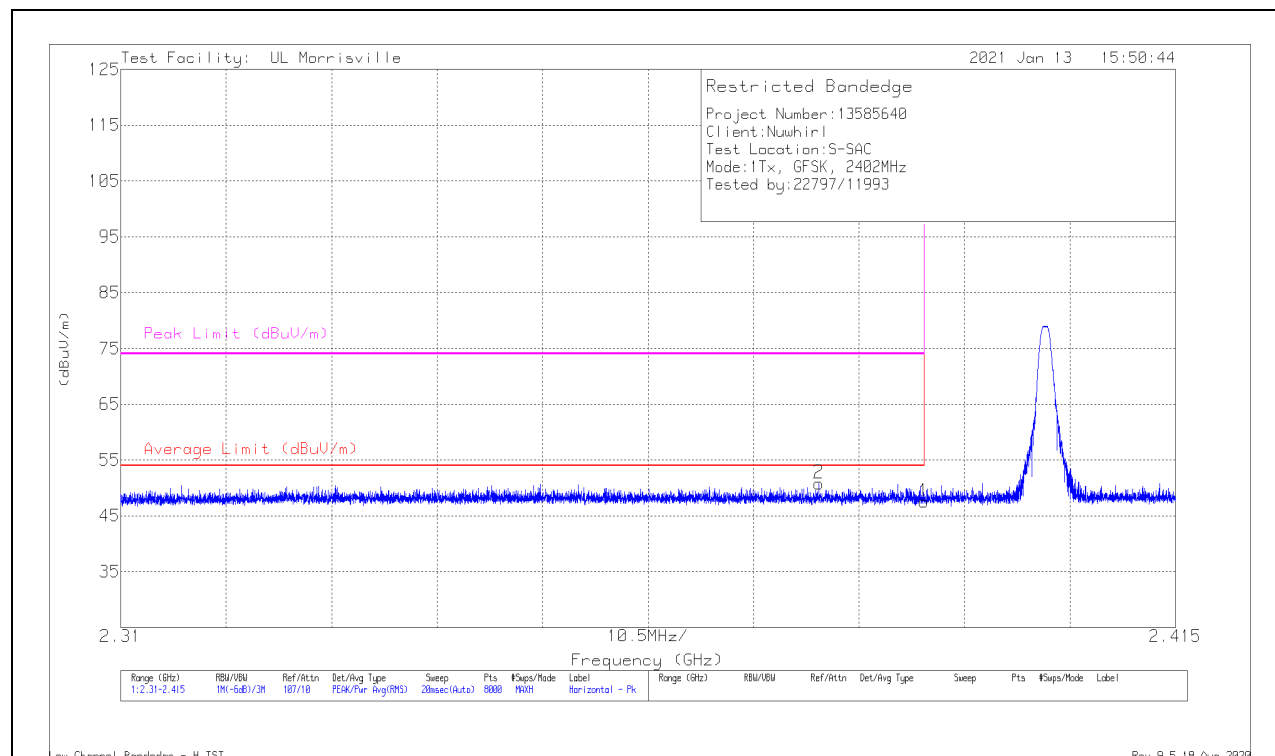
Use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	39.62	Pk	32.1	-24.2	0	47.52	-	-	74	-26.48	268	241	H
	* ** 2.39	39.62	Pk	32.1	-24.2	-24	23.52	54	-30.48	-	-	268	241	H
2	* ** 2.37951	42.95	Pk	32.2	-24.3	0	50.85	-	-	74	-23.15	268	241	H
	* ** 2.37951	42.95	Pk	32.2	-24.3	-24	26.85	54	-27.15	-	-	268	241	H

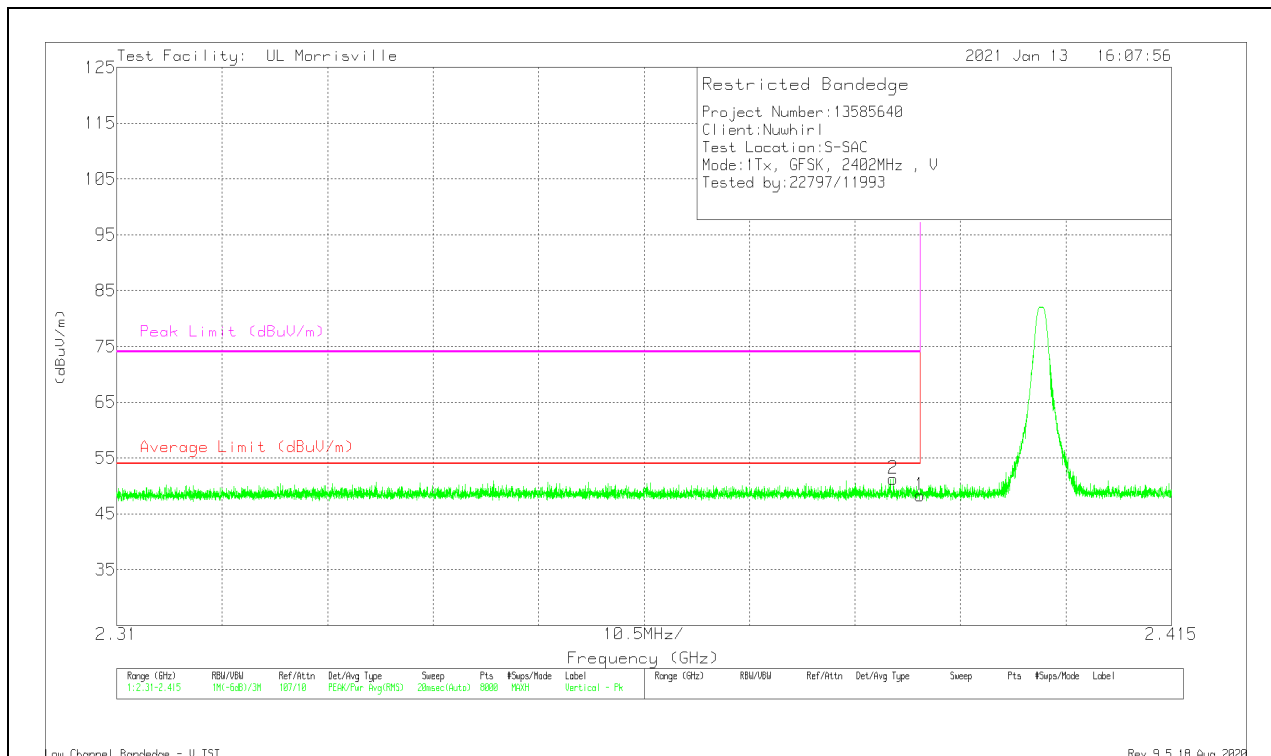
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement
See note in section 9.1

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	40.39	Pk	32.1	-24.2	0	48.29	-	-	74	-25.71	306	306	V
	* ** 2.39	40.39	Pk	32.1	-24.2	-24	24.29	54	-28.71	-	-	306	306	V
2	* ** 2.38732	43.35	Pk	32.2	-24.3	0	51.25	-	-	74	-22.75	306	306	V
	* ** 2.38732	43.35	Pk	32.2	-24.3	-24	27.25	54	-26.75	-	-	306	306	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

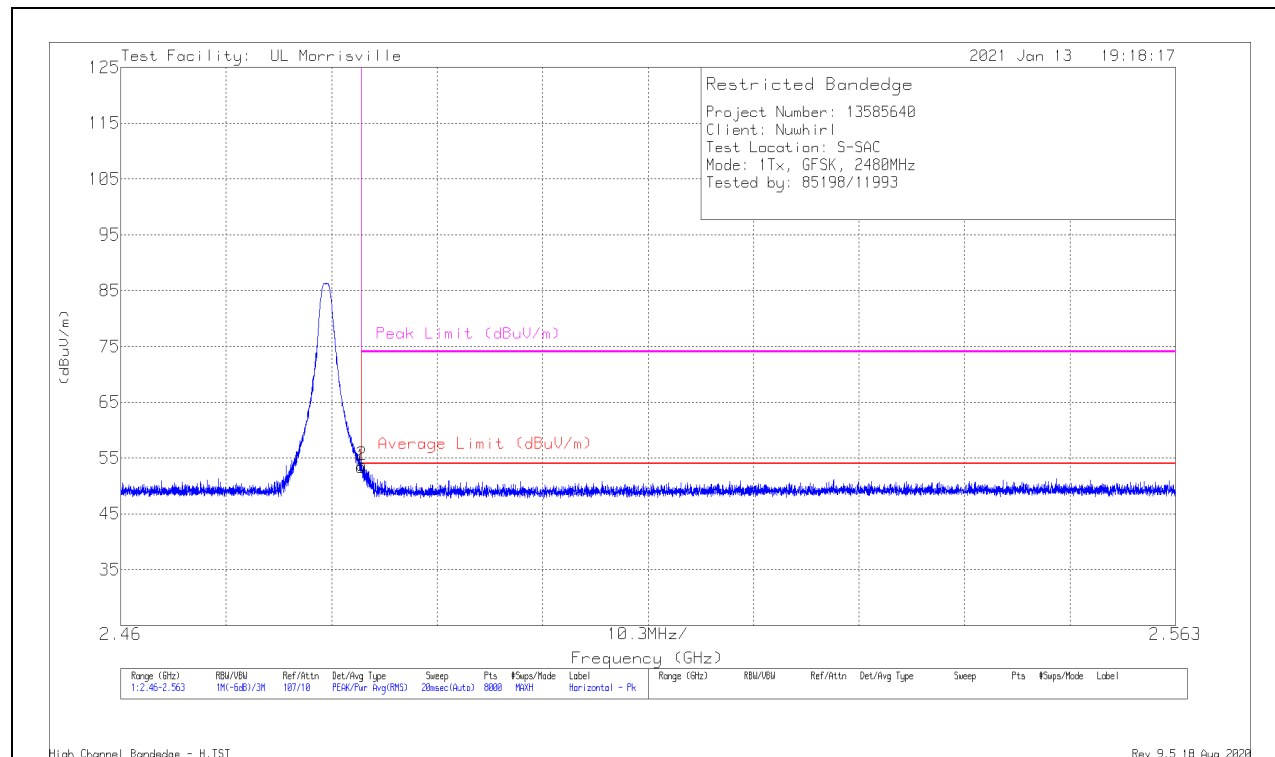
Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	45.12	Pk	32.4	-24.1	0	53.42	-	-	74	-20.58	119	114	H
	* ** 2.4835	45.12	Pk	32.4	-24.1	-24	29.42	54	-24.58	-	-	119	114	H
2	* ** 2.48358	45.5	Pk	32.4	-24.1	0	53.8	-	-	74	-20.2	119	114	H
	* ** 2.48358	45.5	Pk	32.4	-24.1	-24	29.8	54	-24.2	-	-	119	114	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

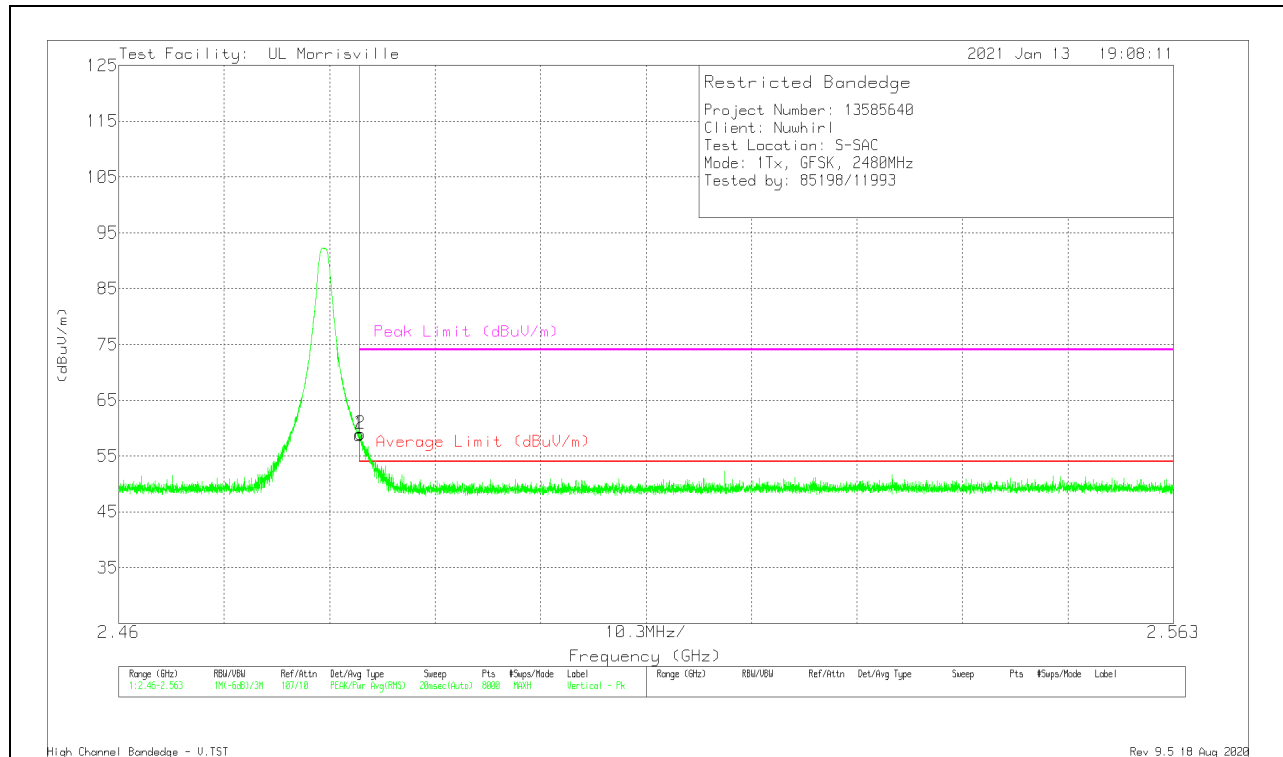
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	50.5	Pk	32.4	-24.1	0	58.8	-	-	74	-15.2	351	123	V
	* ** 2.4835	50.5	Pk	32.4	-24.1	-24	34.8	54	-19.2	-	-	351	123	V
2	* ** 2.48362	50.63	Pk	32.4	-24.1	0	58.93	-	-	74	-15.07	351	123	V
	* ** 2.48362	50.63	Pk	32.4	-24.1	-24	34.93	54	-19.07	-	-	351	123	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

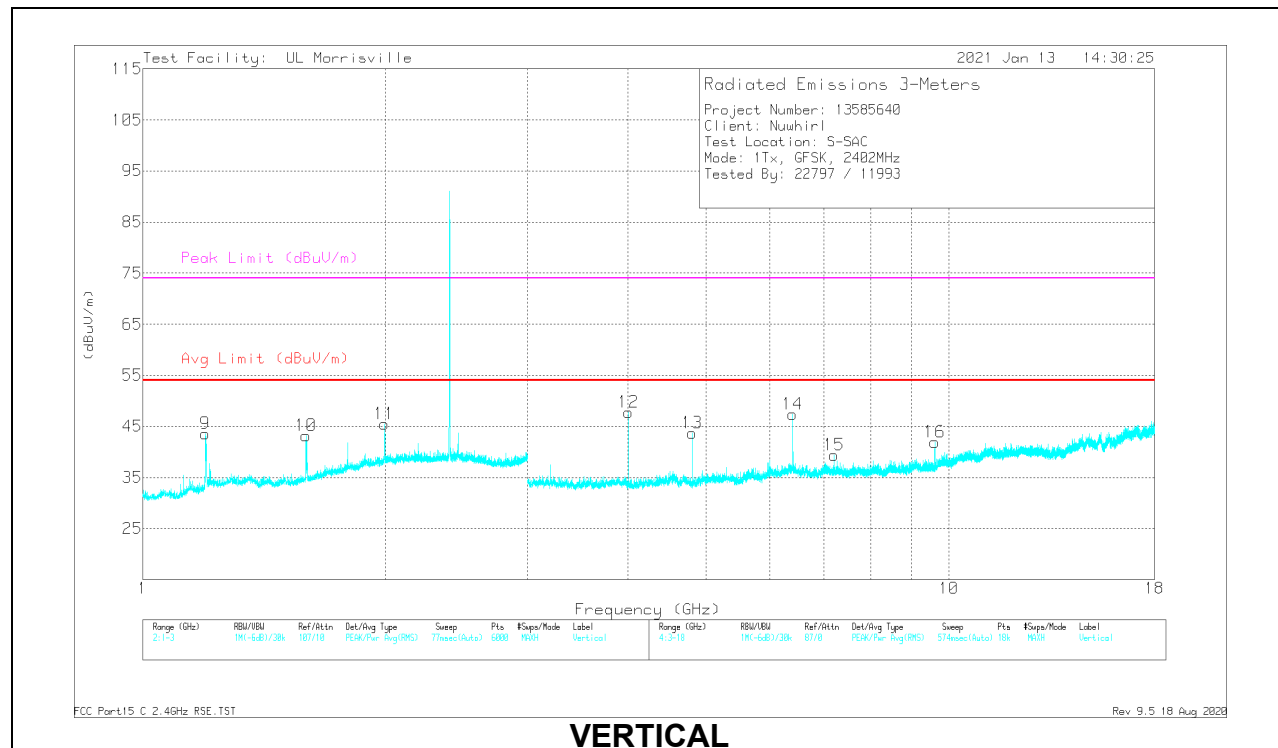
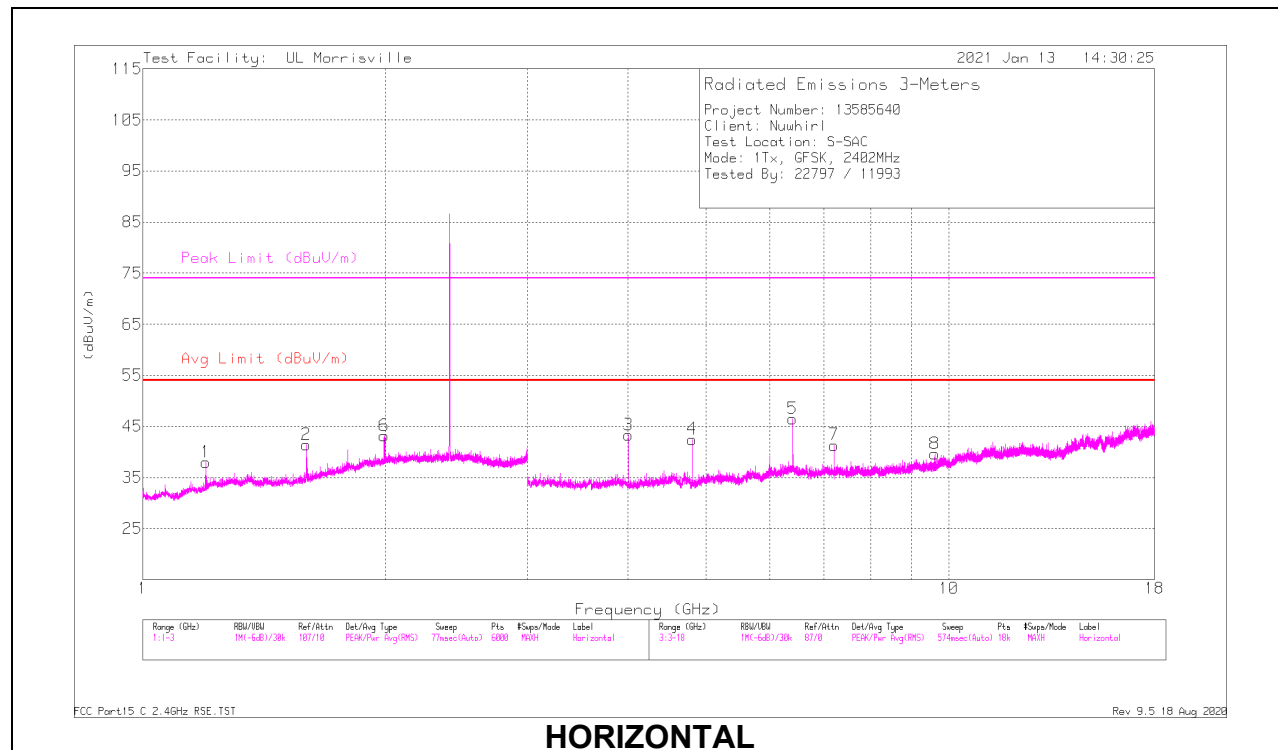
Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.19792	41.59	PK2	28.5	-23.7	0	46.39	-	-	74	-27.61	115	182	H
	* ** 1.19792	41.59	PK2	28.5	-23.7	-24	22.39	54	-31.61	-	-	115	182	H
2	* ** 1.59671	43.86	PK2	28.4	-22.2	0	50.06	-	-	74	-23.94	274	164	H
	* ** 1.59671	43.86	PK2	28.4	-22.2	-24	26.06	54	-27.94	-	-	274	164	H
9	* ** 1.1962	38.07	PK2	28.5	-23.7	0	42.87	-	-	74	-31.13	274	199	V
	* ** 1.1962	38.07	PK2	28.5	-23.7	-24	18.87	54	-35.13	-	-	274	199	V
10	* ** 1.59398	44.96	PK2	28.3	-22.2	0	51.06	-	-	74	-22.94	39	301	V
	* ** 1.59398	44.96	PK2	28.3	-22.2	-24	27.06	54	-26.94	-	-	39	301	V
3	* ** 4.00168	38.83	PK2	33.4	-31.8	0	40.43	-	-	74	-33.57	275	237	H
	* ** 4.00168	38.83	PK2	33.4	-31.8	-24	16.43	54	-37.57	-	-	275	237	H
4	* ** 4.803	37.34	PK2	34	-30.8	0	40.54	-	-	74	-33.46	295	213	H
	* ** 4.803	37.34	PK2	34	-30.8	-24	16.54	54	-37.46	-	-	295	213	H
12	* ** 4.00351	39.08	PK2	33.4	-31.8	0	40.68	-	-	74	-33.32	279	104	V
	* ** 4.00351	39.08	PK2	33.4	-31.8	-24	16.68	54	-37.32	-	-	279	104	V
13	* ** 4.80333	37.65	PK2	34	-30.8	0	40.85	-	-	74	-33.15	68	258	V
	* ** 4.80333	37.65	PK2	34	-30.8	-24	16.85	54	-37.15	-	-	68	258	V
6	1.9925	34.12	Pk	31.6	-22.5	0	43.22	-	-	-	-	0-360	199	H
11	1.9945	36.39	Pk	31.6	-22.5	0	45.49	-	-	-	-	0-360	199	V
5	6.40519	39.35	Pk	35.6	-28.5	0	46.45	-	-	-	-	0-360	199	H
14	6.40519	40.32	Pk	35.6	-28.5	0	47.42	-	-	-	-	0-360	101	V
7	7.20607	33.65	Pk	35.6	-27.9	0	41.35	-	-	-	-	0-360	199	H
15	7.20607	31.68	Pk	35.6	-27.9	0	39.38	-	-	-	-	0-360	101	V
8	9.60787	29.36	Pk	36.6	-26.3	0	39.66	-	-	-	-	0-360	199	H
16	9.60787	31.67	Pk	36.6	-26.3	0	41.97	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

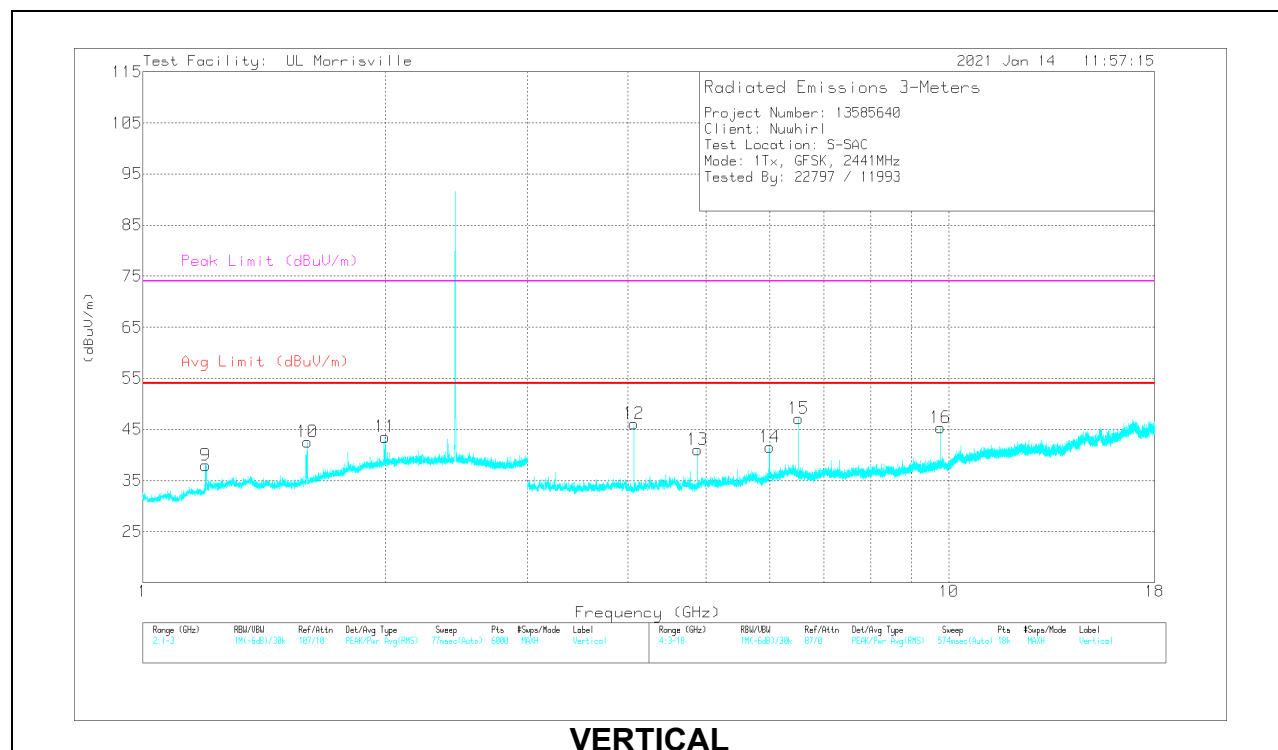
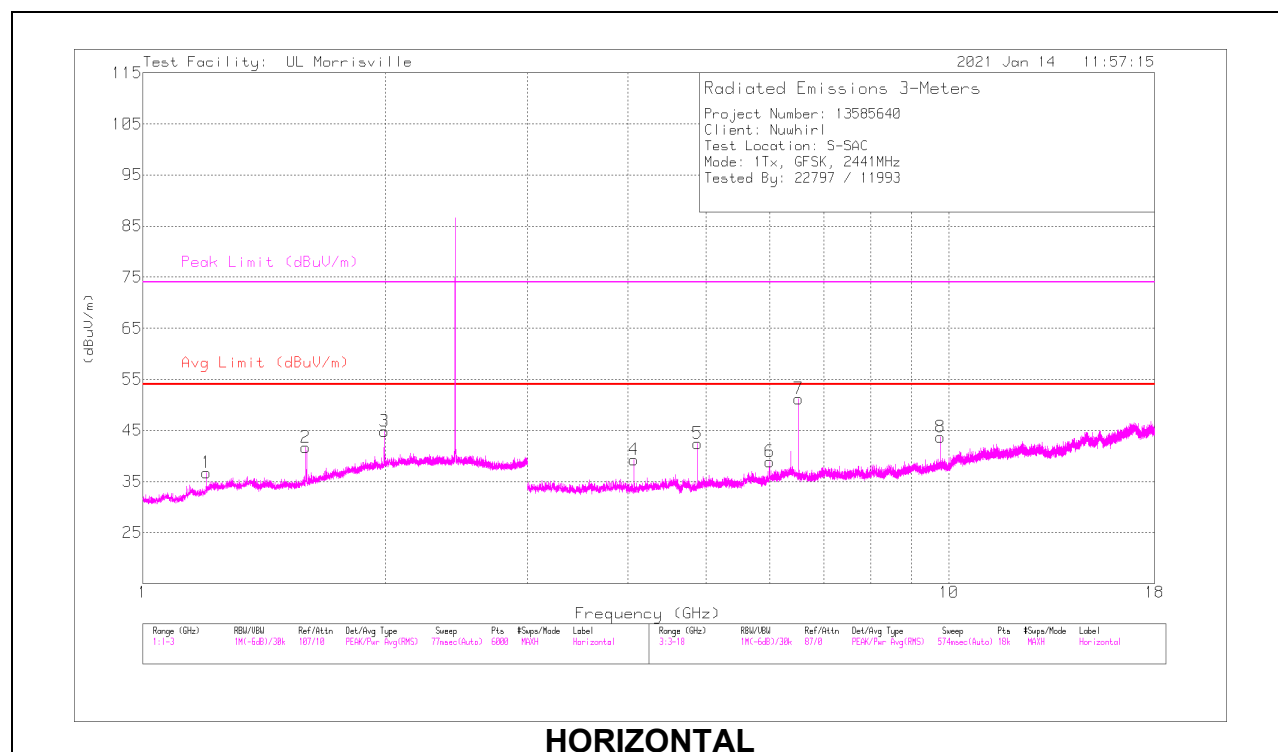
PK2 - Maximum Peak

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.19813	40.16	PK2	28.5	-23.7	0	44.96	-	-	74	-29.04	119	267	H
	* ** 1.19813	40.16	PK2	28.5	-23.7	-24	20.96	54	-33.04	-	-	119	267	H
2	* ** 1.59282	44.47	PK2	28.3	-22.2	0	50.57	-	-	74	-23.43	111	152	H
	* ** 1.59282	44.47	PK2	28.3	-22.2	-24	26.57	54	-27.43	-	-	111	152	H
9	* ** 1.1948	46.55	PK2	28.5	-23.7	0	51.35	-	-	74	-22.65	227	230	V
	* ** 1.1948	46.55	PK2	28.5	-23.7	-24	27.35	54	-26.65	-	-	227	230	V
10	* ** 1.59981	46.02	PK2	28.4	-22.2	0	52.22	-	-	74	-21.78	260	385	V
	* ** 1.59981	46.02	PK2	28.4	-22.2	-24	28.22	54	-25.78	-	-	260	385	V
4	* ** 4.06844	47.15	PK2	33.4	-32.6	0	47.95	-	-	74	-26.05	52	251	H
	* ** 4.06844	47.15	PK2	33.4	-32.6	-24	23.95	54	-30.05	-	-	52	251	H
5	* ** 4.88205	45.46	PK2	34	-30.8	0	48.66	-	-	74	-25.34	73	212	H
	* ** 4.88205	45.46	PK2	34	-30.8	-24	24.66	54	-29.43	-	-	73	212	H
12	* ** 4.0684	47.91	PK2	33.4	-32.6	0	48.71	-	-	74	-25.29	24	190	V
	* ** 4.0684	47.91	PK2	33.4	-32.6	-24	24.71	54	-29.29	-	-	24	190	V
13	* ** 4.8821	45.97	PK2	34	-30.8	0	49.17	-	-	74	-24.83	31	102	V
	* ** 4.8821	45.97	PK2	34	-30.8	-24	25.17	54	-28.83	-	-	31	102	V
3	1.99417	35.7	Pk	31.6	-22.5	0	44.8	-	-	-	-	0-360	200	H
11	1.99817	34.41	Pk	31.6	-22.5	0	43.51	-	-	-	-	0-360	101	V
14	5.99267	34.54	Pk	35.2	-28.2	0	41.54	-	-	-	-	0-360	199	V
6	5.99933	31.96	Pk	35.2	-28.3	0	38.86	-	-	-	-	0-360	199	H
7	6.50936	44.94	Pk	35.6	-29.4	0	51.14	-	-	-	-	0-360	199	H
15	6.50936	40.92	Pk	35.6	-29.4	0	47.12	-	-	-	-	0-360	101	V
8	9.76371	32.75	Pk	36.7	-25.8	0	43.65	-	-	-	-	0-360	101	H
16	9.76371	34.41	Pk	36.7	-25.8	0	45.31	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Av - Average detection

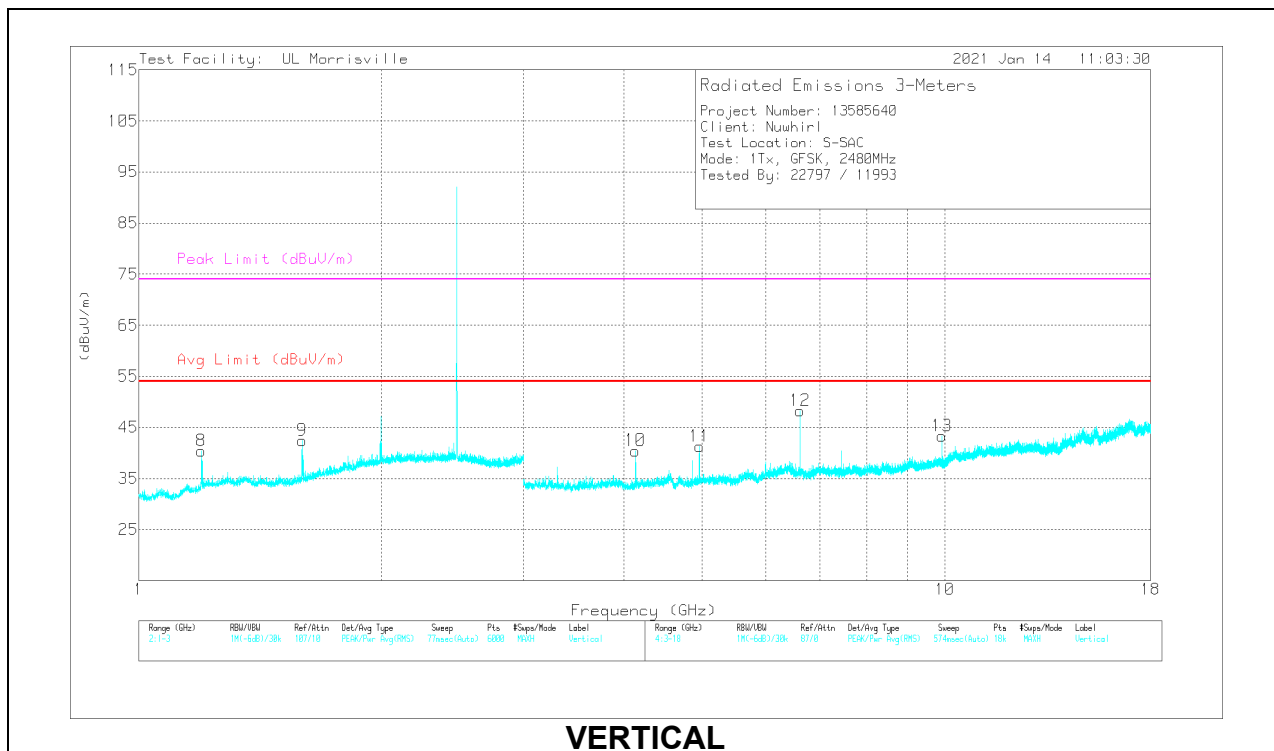
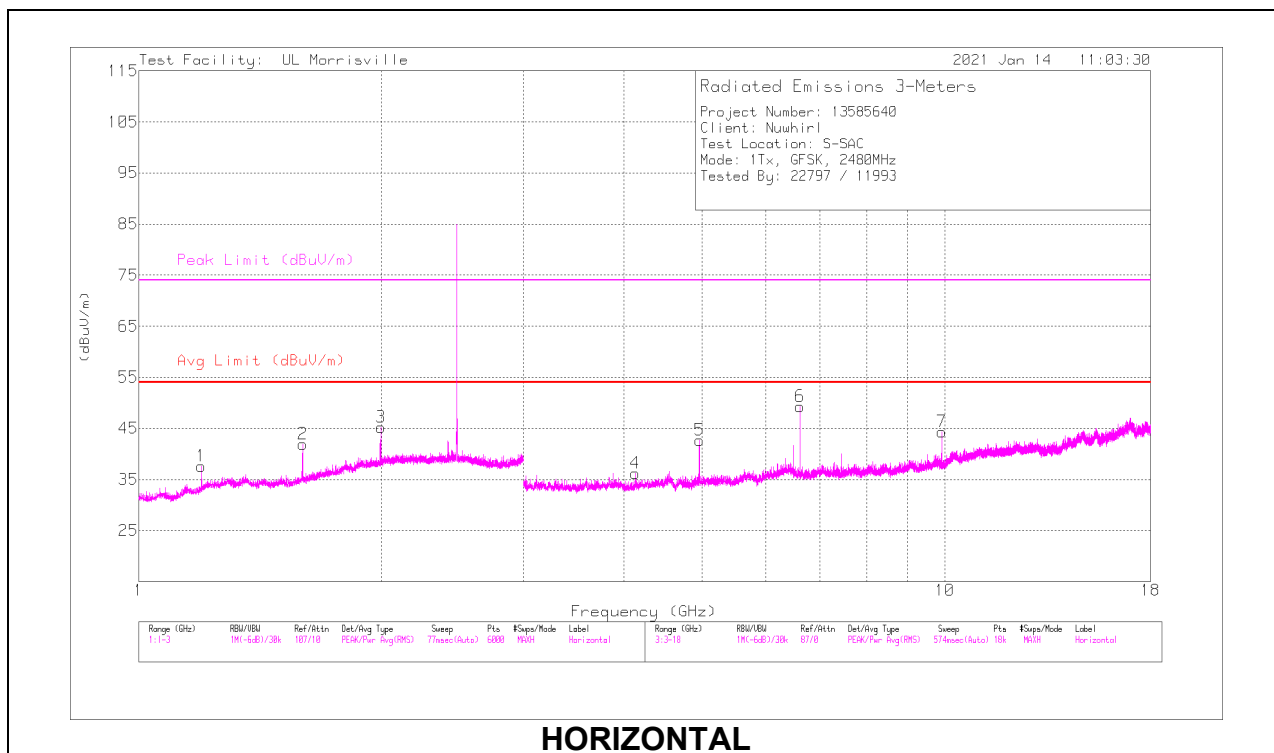
PK2 - Maximum Peak

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.19608	41.29	PK2	28.5	-23.7	0	46.09	-	-	74	-27.91	342	293	H
	* ** 1.19608	41.29	PK2	28.5	-23.7	-24	25.09	54	-28.91	-	-	342	293	H
2	* ** 1.5974	43.74	PK2	28.4	-22.2	0	49.94	-	-	74	-24.06	69	292	H
	* ** 1.5974	43.74	PK2	28.4	-22.2	-24	25.94	54	-28.06	-	-	69	292	H
8	* ** 1.19554	46.09	PK2	28.5	-23.7	0	50.89	-	-	74	-23.11	234	212	V
	* ** 1.19554	46.09	PK2	28.5	-23.7	-24	26.89	54	-27.11	-	-	234	212	V
9	* ** 1.59589	43.84	PK2	28.4	-22.2	0	50.04	-	-	74	-23.96	335	129	V
	* ** 1.59589	43.84	PK2	28.4	-22.2	-24	26.04	54	-27.96	-	-	335	129	V
4	* ** 4.13363	41.84	PK2	33.4	-31.8	0	43.44	-	-	74	-30.56	164	198	H
	* ** 4.13363	41.84	PK2	33.4	-31.8	-24	19.44	54	-34.56	-	-	164	198	H
5	* ** 4.96023	44.43	PK2	33.9	-31	0	47.33	-	-	74	-26.67	83	209	H
	* ** 4.96023	44.43	PK2	33.9	-31	-24	23.33	54	-30.67	-	-	83	209	H
10	* ** 4.13363	44.59	PK2	33.4	-31.8	0	46.19	-	-	74	-27.81	21	182	V
	* ** 4.13363	44.59	PK2	33.4	-31.8	-24	22.19	54	-31.81	-	-	21	182	V
11	* ** 4.95987	44.72	PK2	33.9	-31	0	47.62	-	-	74	-26.38	30	101	V
	* ** 4.95987	44.72	PK2	33.9	-31	-24	23.62	54	-30.38	-	-	30	101	V
3	1.9985	36.08	Pk	31.6	-22.5	0	45.18	-	-	-	-	0-360	199	H
6	6.61354	41.65	Pk	35.6	-28	0	49.25	-	-	-	-	0-360	199	H
12	6.61354	40.64	Pk	35.6	-28	0	48.24	-	-	-	-	0-360	199	V
7	9.91955	33.13	Pk	37	-25.8	0	44.33	-	-	-	-	0-360	101	H
13	9.91955	32.09	Pk	37	-25.8	0	43.29	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

Pk - Peak detector

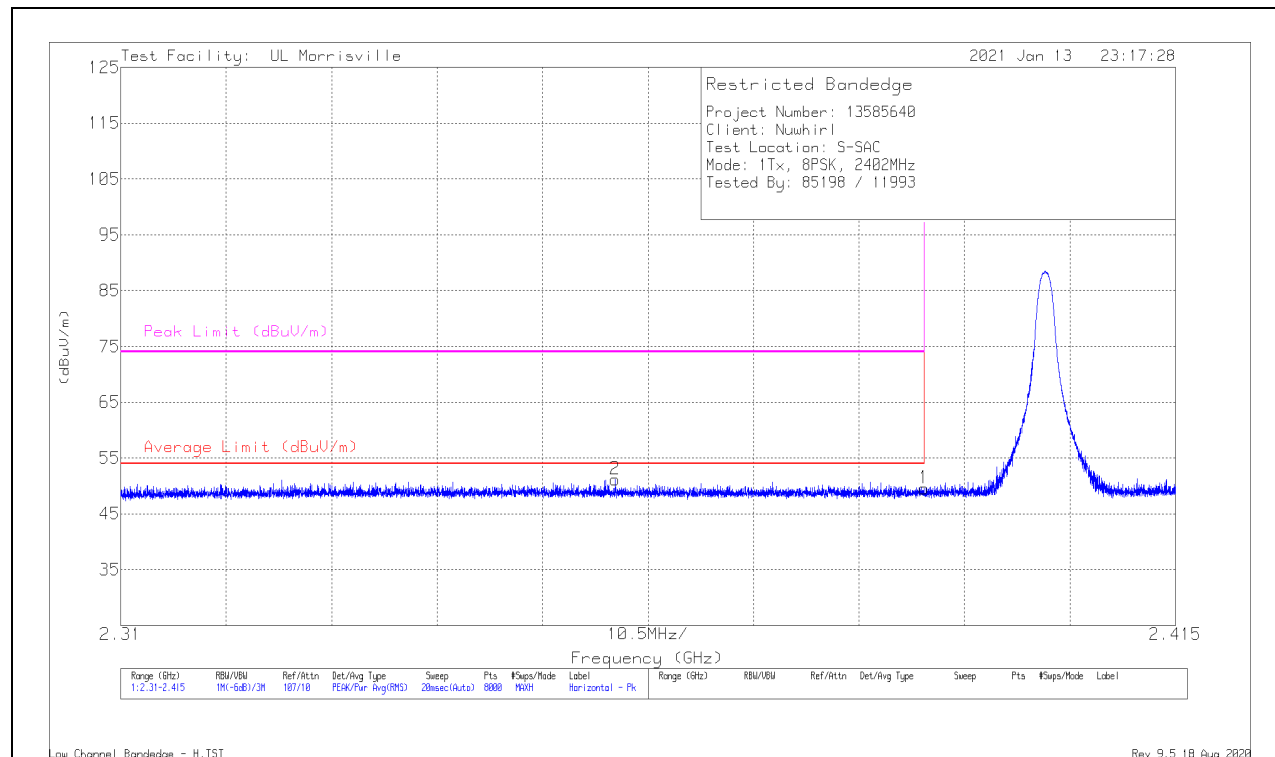
*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	41.63	Pk	32.1	-24.2	0	49.53	-	-	74	-24.47	86	277	H
	* ** 2.39	41.63	Pk	32.1	-24.2	-24	25.53	54	-28.47	-	--	86	277	H
2	* ** 2.3592	43.21	Pk	32.2	-24.3	0	51.11	-	-	74	-22.89	86	277	H
	* ** 2.3592	43.21	Pk	32.2	-24.3	-24	27.11	54	-26.89	-	-	86	277	H

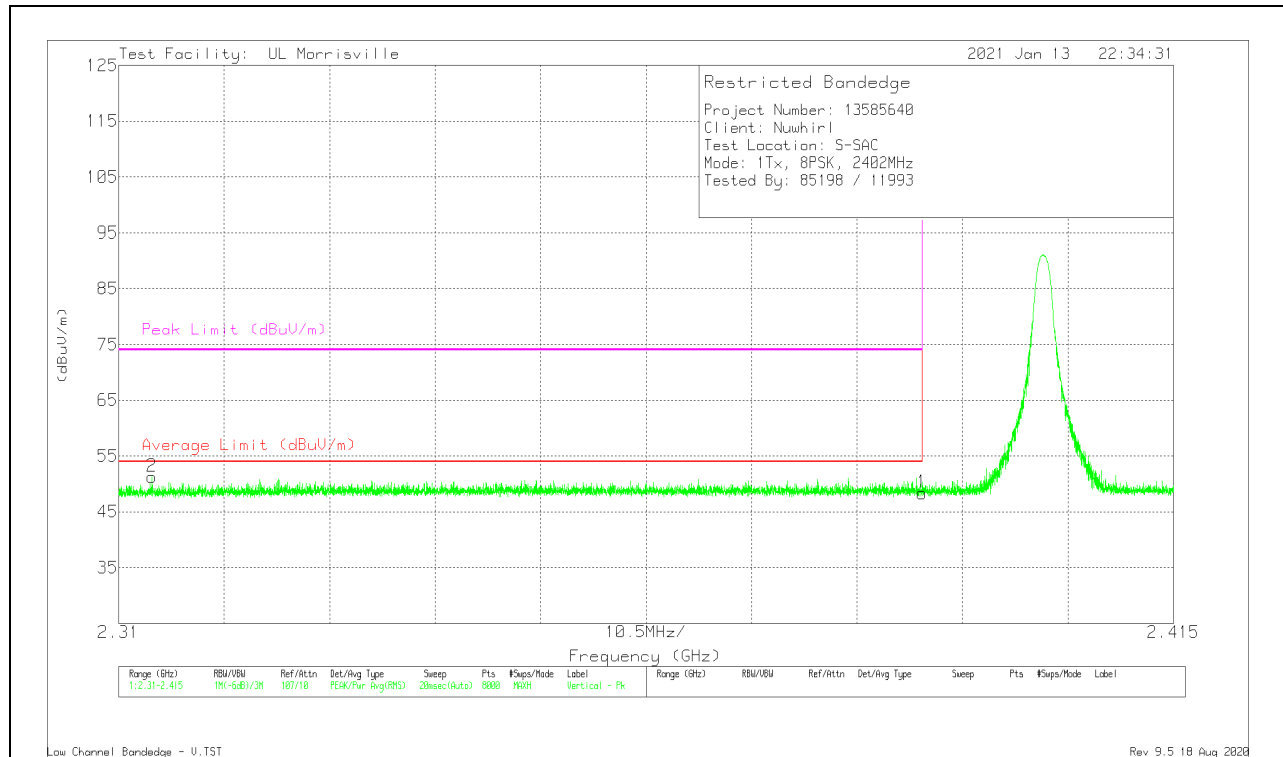
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement. See note in section 9.1

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	40.47	Pk	32.1	-24.2	0	48.37	-	-	74	-25.63	39	271	V
	* ** 2.39	40.47	Pk	32.1	-24.2	-24	24.37	54	-29.63	-	-	39	271	V
2	* ** 2.31331	43.56	Pk	32	-24.3	0	51.26	-	-	74	-22.74	39	271	V
	* ** 2.31331	43.56	Pk	32	-24.3	-24	27.26	54	-26.74	-	-	39	271	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

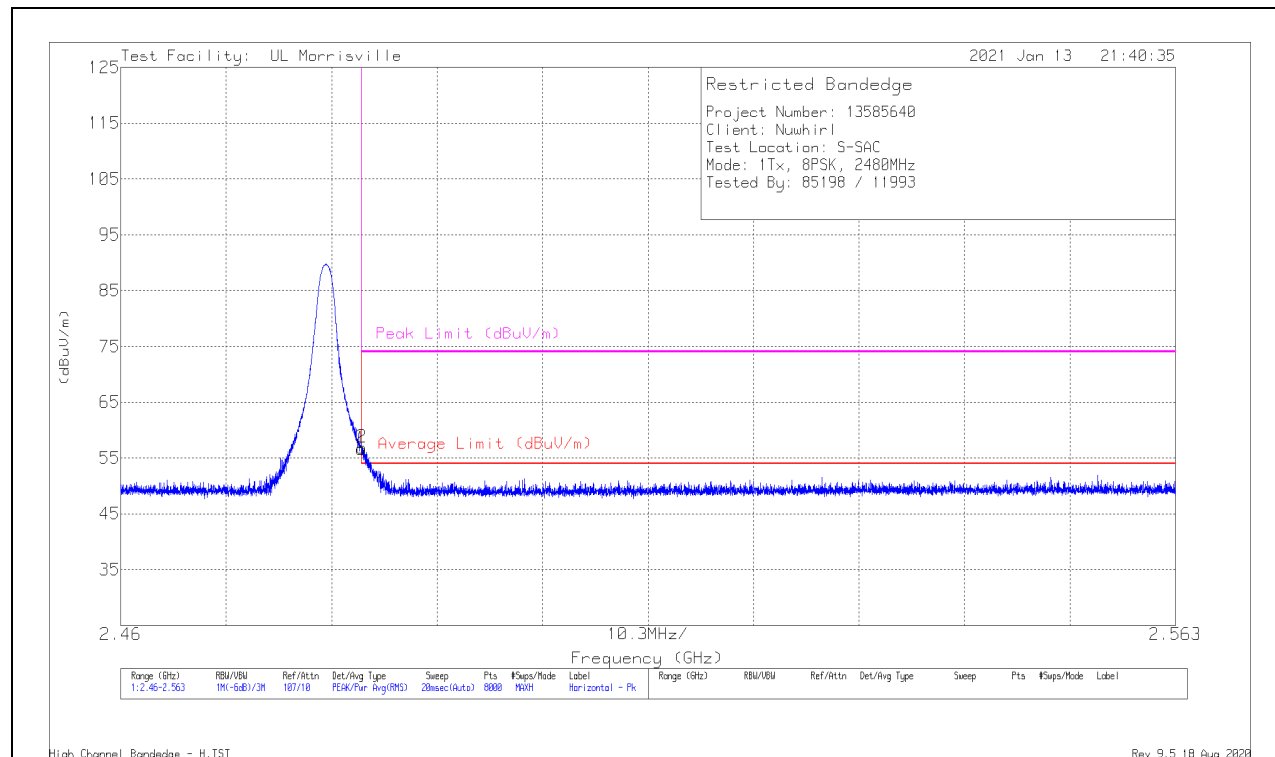
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.
See note in section 9.1

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	48.35	Pk	32.4	-24.1	0	56.65	-	-	74	-17.35	106	223	H
	* ** 2.4835	48.35	Pk	32.4	-24.1	-24	32.65	54	-21.35	-	-	106	223	H
2	* ** 2.48355	48.6	Pk	32.4	-24.1	0	56.9	-	-	74	-17.1	106	223	H
	* ** 2.48355	48.6	Pk	32.4	-24.1	-24	32.9	54	-21.1	-	-	106	223	H

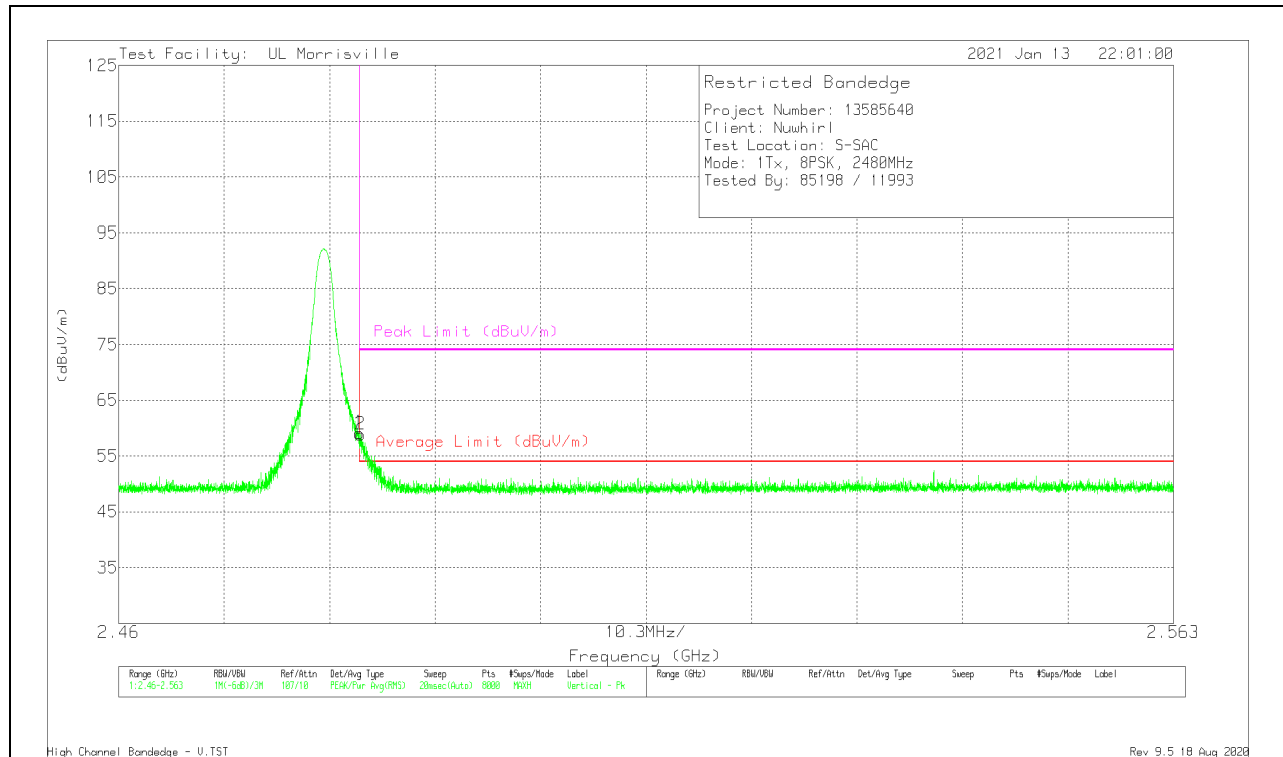
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.
See note in section 9.1

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	50.85	Pk	32.4	-24.1	0	59.15	-	-	74	-14.85	42	237	V
	* ** 2.4835	50.85	Pk	32.4	-24.1	-24	35.15	54	-18.85	-	-	42	237	V
2	* ** 2.48362	50.57	Pk	32.4	-24.1	0	58.87	-	-	74	-15.13	42	237	V
	* ** 2.48362	50.57	Pk	32.4	-24.1	-24	34.87	54	-19.13	-	-	42	237	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

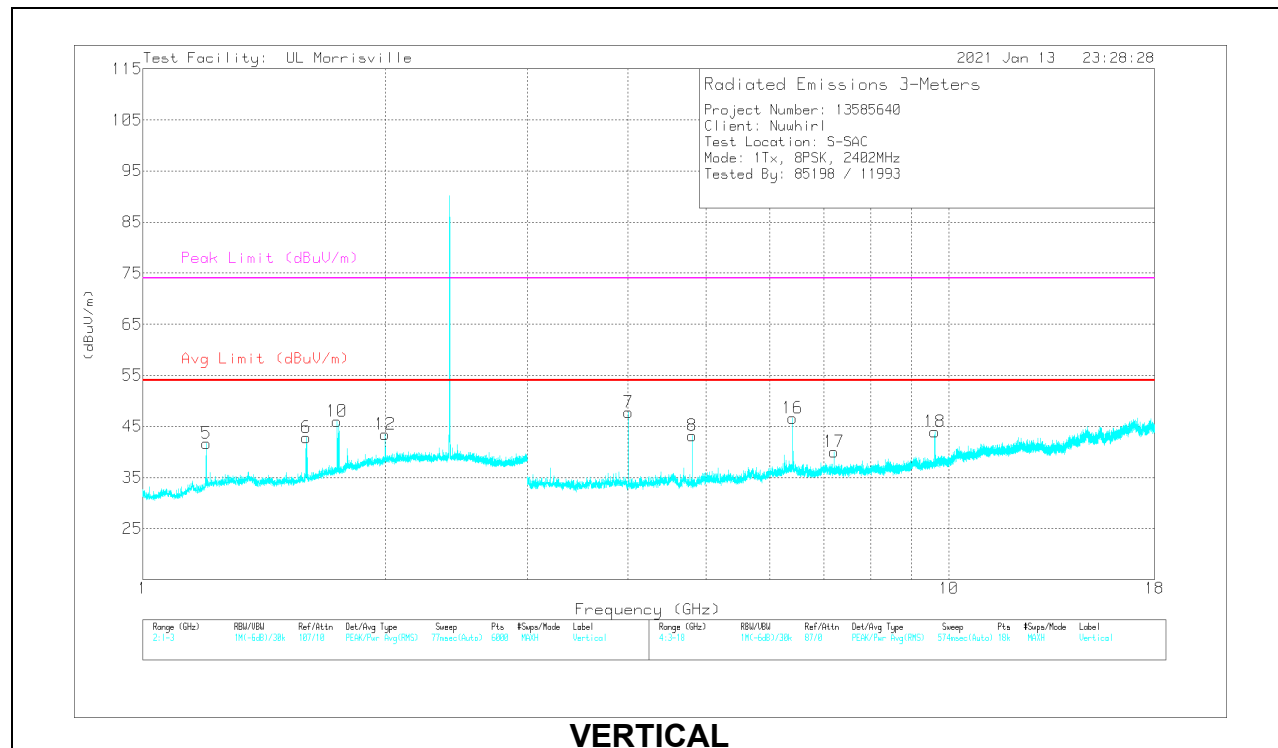
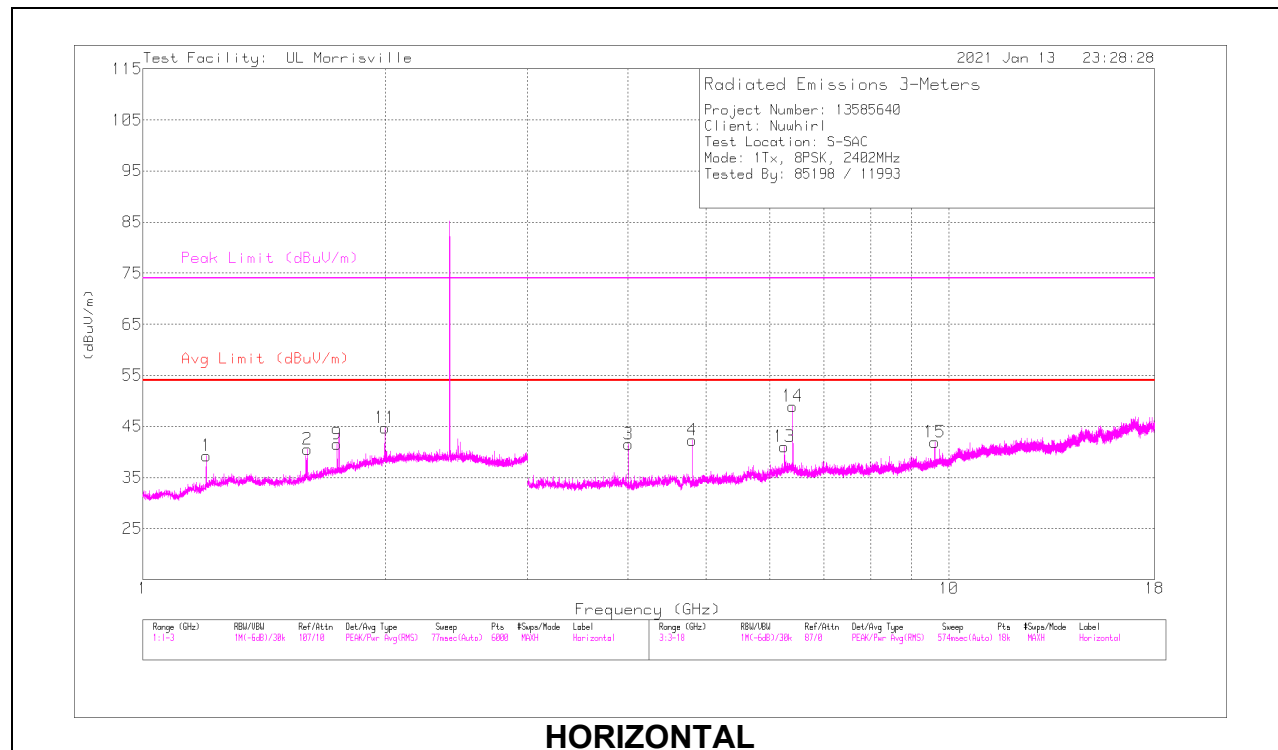
Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.19792	41.47	PK2	28.5	-23.7	0	46.27	-	-	74	-27.73	121	190	H
	*** 1.19792	41.47	PK2	28.5	-23.7	-24	22.27	54	-31.73	-	-	121	190	H
2	*** 1.59921	43.12	PK2	28.4	-22.2	0	49.32	-	-	74	-24.68	71	291	H
	*** 1.59921	43.12	PK2	28.4	-22.2	-24	25.32	54	-28.68	-	-	71	291	H
9	** 1.74193	35.99	PK2	29.7	-22.2	0	43.49	-	-	74	-30.51	90	149	H
	** 1.74193	35.99	PK2	29.7	-22.2	-24	19.49	54	-34.51	-	-	90	149	H
5	*** 1.19778	45.35	PK2	28.5	-23.7	0	50.15	-	-	74	-23.85	218	222	V
	*** 1.19778	45.35	PK2	28.5	-23.7	-24	26.15	54	-27.85	-	-	218	222	V
6	*** 1.5996	46.3	PK2	28.4	-22.2	0	52.5	-	-	74	-21.5	37	172	V
	*** 1.5996	46.3	PK2	28.4	-22.2	-24	28.5	54	-25.5	-	-	37	172	V
10	** 1.74251	35.93	PK2	29.7	-22.2	0	43.43	-	-	74	-30.57	248	341	V
	** 1.74251	35.93	PK2	29.7	-22.2	-24	19.43	54	-34.57	-	-	248	341	V
3	*** 4.00345	48.13	PK2	33.4	-31.8	0	49.73	-	-	74	-24.27	46	280	H
	*** 4.00345	48.13	PK2	33.4	-31.8	-24	25.73	54	-28.27	-	-	46	280	H
4	*** 4.80411	46.78	PK2	34	-30.9	0	49.88	-	-	74	-24.12	54	227	H
	*** 4.80411	46.78	PK2	34	-30.9	-24	25.88	54	-28.12	-	-	54	227	H
7	*** 4.00333	49.84	PK2	33.4	-31.8	0	51.44	-	-	74	-22.56	1	118	V
	*** 4.00333	49.84	PK2	33.4	-31.8	-24	27.44	54	-26.56	-	-	1	118	V
8	*** 4.80414	45.56	PK2	34	-30.9	0	48.66	-	-	74	-25.34	33	102	V
	*** 4.80414	45.56	PK2	34	-30.9	-24	24.66	54	-29.34	-	-	33	102	V
11	1.99717	35.58	Pk	31.6	-22.5	0	44.68	-	-	-	-	0-360	199	H
12	1.99917	34.3	Pk	31.6	-22.5	0	43.4	-	-	-	-	0-360	101	V
13	6.25352	33.83	Pk	35.5	-28.3	0	41.03	-	-	-	-	0-360	200	H
14	6.40519	41.86	Pk	35.6	-28.5	0	48.96	-	-	-	-	0-360	200	H
16	6.40519	39.49	Pk	35.6	-28.5	0	46.59	-	-	-	-	0-360	101	V
17	7.20524	32.29	Pk	35.6	-27.9	0	39.99	-	-	-	-	0-360	101	V
15	9.60787	31.57	Pk	36.6	-26.3	0	41.87	-	-	-	-	0-360	101	H
18	9.60787	33.65	Pk	36.6	-26.3	0	43.95	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

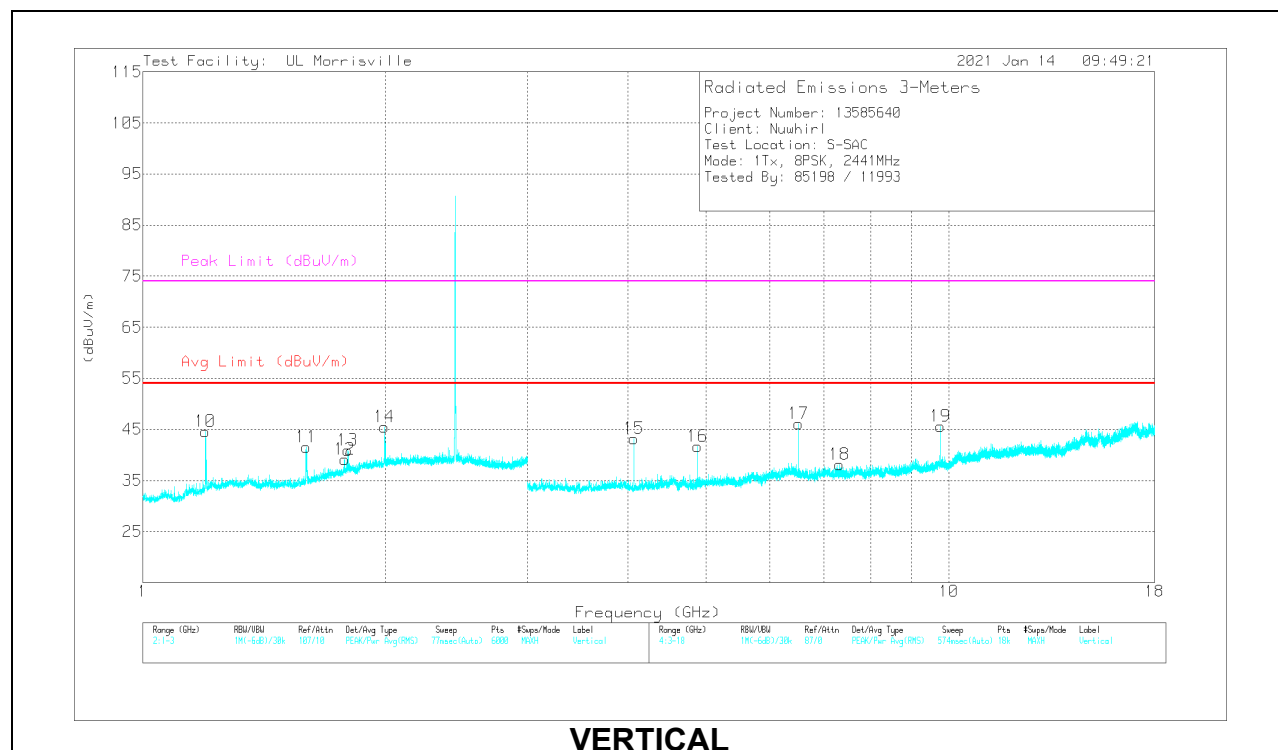
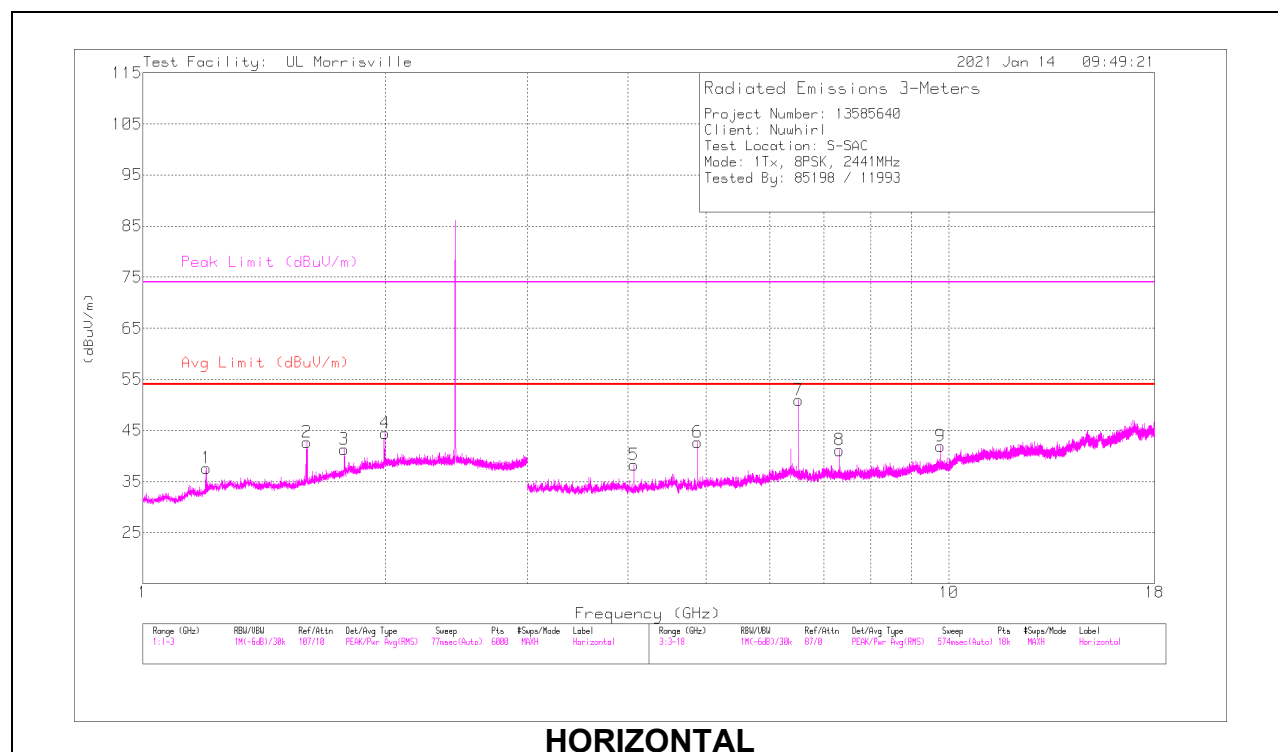
PK2 - Maximum Peak

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.

See note in section 9.1

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.19844	40.98	PK2	28.5	-23.7	0	45.78	-	-	74	-28.22	121	187	H
	*** 1.19844	40.98	PK2	28.5	-23.7	-24	21.78	54	-32.22	-	-	121	187	H
2	*** 1.5987	43.41	PK2	28.4	-22.2	0	49.61	-	-	74	-24.39	115	248	H
	*** 1.5987	43.41	PK2	28.4	-22.2	-24	25.61	54	-28.29	-	-	115	248	H
3	** 1.77859	47.66	PK2	30.3	-22.2	0	55.76	-	-	74	-18.24	132	396	H
	** 1.77859	47.66	PK2	30.3	-22.2	-24	31.76	54	-22.24	-	-	132	396	H
10	*** 1.19458	46.52	PK2	28.5	-23.7	0	51.32	-	-	74	-22.68	228	213	V
	*** 1.19458	46.52	PK2	28.5	-23.7	-24	27.32	54	-26.68	-	-	228	213	V
11	*** 1.59628	45.69	PK2	28.4	-22.2	0	51.89	-	-	74	-22.11	223	160	V
	*** 1.59628	45.69	PK2	28.4	-22.2	-24	27.89	54	-26.11	-	-	223	160	V
12	** 1.7784	42.72	PK2	30.3	-22.2	0	50.82	-	-	74	-23.18	102	230	V
	** 1.7784	42.72	PK2	30.3	-22.2	-24	26.82	54	-27.18	-	-	102	230	V
5	*** 4.06826	40.46	PK2	33.4	-32.6	0	41.26	-	-	74	-32.74	345	395	H
	*** 4.06826	40.46	PK2	33.4	-32.6	-24	17.26	54	-36.74	-	-	345	395	H
6	*** 4.8822	46.41	PK2	34	-30.8	0	49.61	-	-	74	-24.39	83	215	H
	*** 4.8822	46.41	PK2	34	-30.8	-24	25.61	54	-28.39	-	-	83	215	H
8	*** 7.32298	40.99	PK2	35.6	-27.4	0	49.19	-	-	74	-24.81	62	212	H
	*** 7.32298	40.99	PK2	35.6	-27.4	-24	25.19	54	-28.81	-	-	62	212	H
15	*** 4.06826	48.31	PK2	33.4	-32.6	0	49.11	-	-	74	-24.89	19	189	V
	*** 4.06826	48.31	PK2	33.4	-32.6	-24	25.11	54	-28.89	-	-	19	189	V
16	*** 4.88216	45.65	PK2	34	-30.8	0	48.85	-	-	74	-25.15	34	105	V
	*** 4.88216	45.65	PK2	34	-30.8	-24	24.85	54	-29.15	-	-	34	105	V
18	*** 7.32305	37.49	PK2	35.6	-27.4	0	45.69	-	-	74	-28.31	2	195	V
	*** 7.32305	37.49	PK2	35.6	-27.4	-24	21.69	54	-32.31	-	-	2	195	V
13	1.79713	32.61	Pk	30.6	-22.3	0	40.91	-	-	-	-	0-360	200	V
14	1.99417	36.32	Pk	31.6	-22.5	0	45.42	-	-	-	-	0-360	200	V
4	1.9985	35.32	Pk	31.6	-22.5	0	44.42	-	-	-	-	0-360	200	H
7	6.50936	44.73	Pk	35.6	-29.4	0	50.93	-	-	-	-	0-360	199	H
17	6.50936	39.86	Pk	35.6	-29.4	0	46.06	-	-	-	-	0-360	101	V
9	9.76371	31	Pk	36.7	-25.8	0	41.9	-	-	-	-	0-360	199	H
19	9.76371	34.71	Pk	36.7	-25.8	0	45.61	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

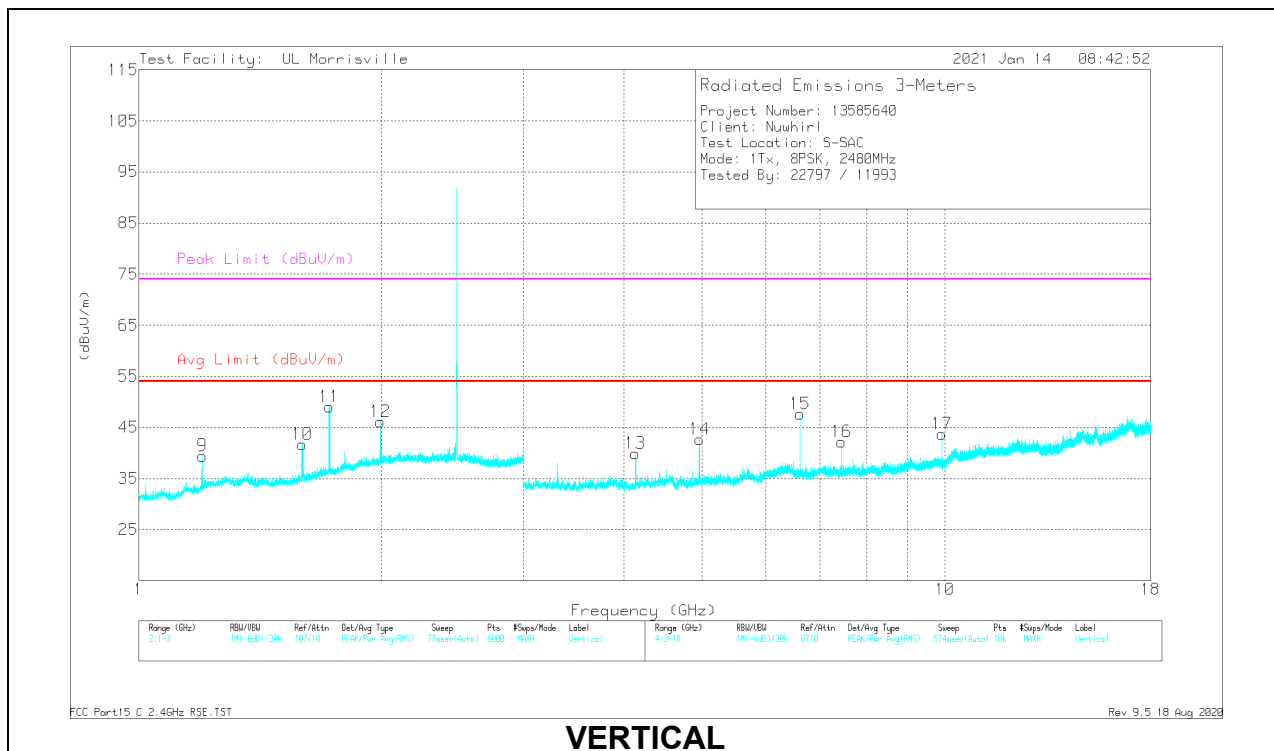
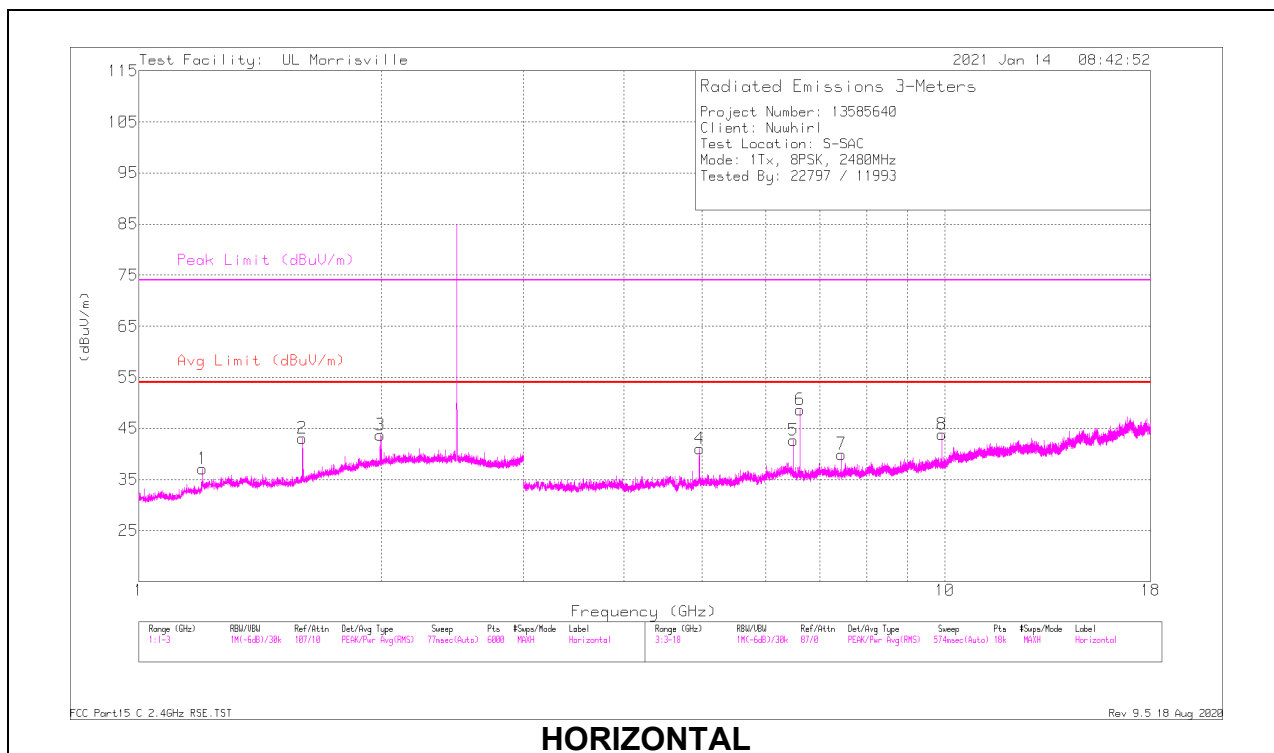
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

Pk - Peak detector

*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.
See note in section 9.1

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.19815	40.16	PK2	28.5	-23.7	0	44.96	-	-	74	-29.04	126	210	H
	* ** 1.19815	40.16	PK2	28.5	-23.7	-24	20.96	54	-33.04	-	-	126	210	H
2	* ** 1.59485	44.1	PK2	28.4	-22.2	0	50.3	-	-	74	-23.7	118	250	H
	* ** 1.59485	44.1	PK2	28.4	-22.2	-24	26.3	54	-27.7	-	-	118	250	H
9	* ** 1.19772	47.56	PK2	28.5	-23.7	0	52.36	-	-	74	-21.64	225	225	V
	* ** 1.19772	47.56	PK2	28.5	-23.7	-24	28.36	54	-25.64	-	-	225	225	V
10	* ** 1.59657	44.63	PK2	28.4	-22.2	0	50.83	-	-	74	-23.17	229	151	V
	* ** 1.59657	44.63	PK2	28.4	-22.2	-24	26.83	54	-27.17	-	-	229	151	V
11	* ** 1.71904	35.78	PK2	29.6	-22.1	0	43.28	-	-	74	-30.72	27	121	V
	* ** 1.71904	35.78	PK2	29.6	-22.1	-24	19.28	54	-34.72	-	-	27	121	V
4	* ** 4.96205	38.59	PK2	33.9	-31	0	41.49	-	-	74	-32.51	122	196	H
	* ** 4.96205	38.59	PK2	33.9	-31	-24	17.49	54	-36.51	-	-	122	196	H
7	* ** 7.4409	35.5	PK2	35.6	-27.7	0	43.4	-	-	74	-30.6	349	102	H
	* ** 7.4409	35.5	PK2	35.6	-27.7	-24	19.43	54	-34.6	-	-	349	102	H
13	* ** 4.13184	39.11	PK2	33.4	-31.8	0	40.71	-	-	74	-33.29	38	363	V
	* ** 4.13184	39.11	PK2	33.4	-31.8	-24	16.71	54	-37.29	-	-	38	363	V
14	* ** 4.9616	38.66	PK2	33.9	-31	0	41.56	-	-	74	-32.44	64	271	V
	* ** 4.9616	38.66	PK2	33.9	-31	-24	17.56	54	-36.44	-	-	64	271	V
16	* ** 7.43948	35.02	PK2	35.6	-27.7	0	42.92	-	-	74	-31.08	53	332	V
	* ** 7.43948	35.02	PK2	35.6	-27.7	-24	18.92	54	-35.08	-	-	53	332	V
3	1.9925	34.61	Pk	31.6	-22.5	0	43.71	-	-	-	-	0-360	200	H
12	1.99517	37.11	Pk	31.6	-22.6	0	46.11	-	-	-	-	0-360	200	V
5	6.48853	36.42	Pk	35.6	-29.3	0	42.72	-	-	-	-	0-360	101	H
6	6.61354	41	Pk	35.6	-28	0	48.6	-	-	-	-	0-360	199	H
15	6.61354	40.07	Pk	35.6	-28	0	47.67	-	-	-	-	0-360	199	V
8	9.91955	32.59	Pk	37	-25.8	0	43.79	-	-	-	-	0-360	101	H
17	9.91955	32.54	Pk	37	-25.8	0	43.74	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

Pk - Peak detector

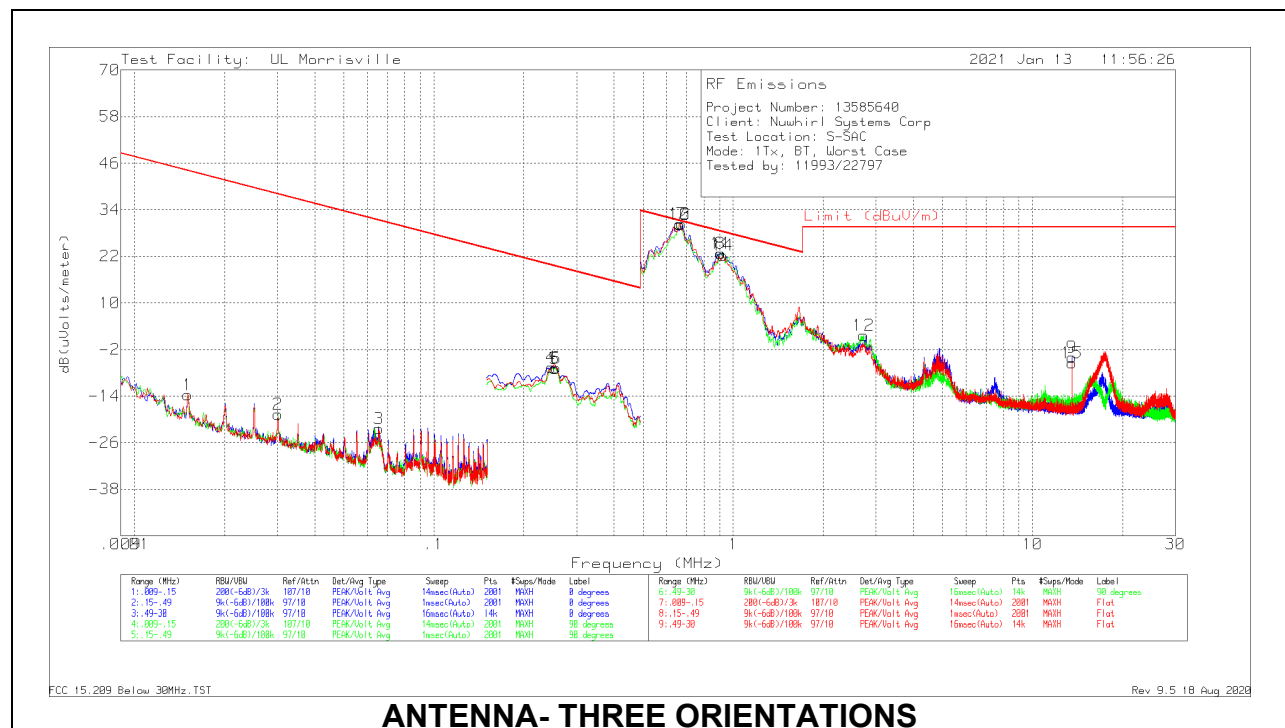
*Note: Duty cycle correction factor of -24 was applied to peak data to obtain an average measurement.
See note in section 9.1

10.2. WORST CASE BELOW 30MHZ

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

The below 30 MHz limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency 15.04 kHz resulted in a level of -13.74 dBuV/m, which is equivalent to $-13.74 - 51.5 = -65.24$ dBuA/m, which has the same margin, -57.80 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



Below 30MHz Data

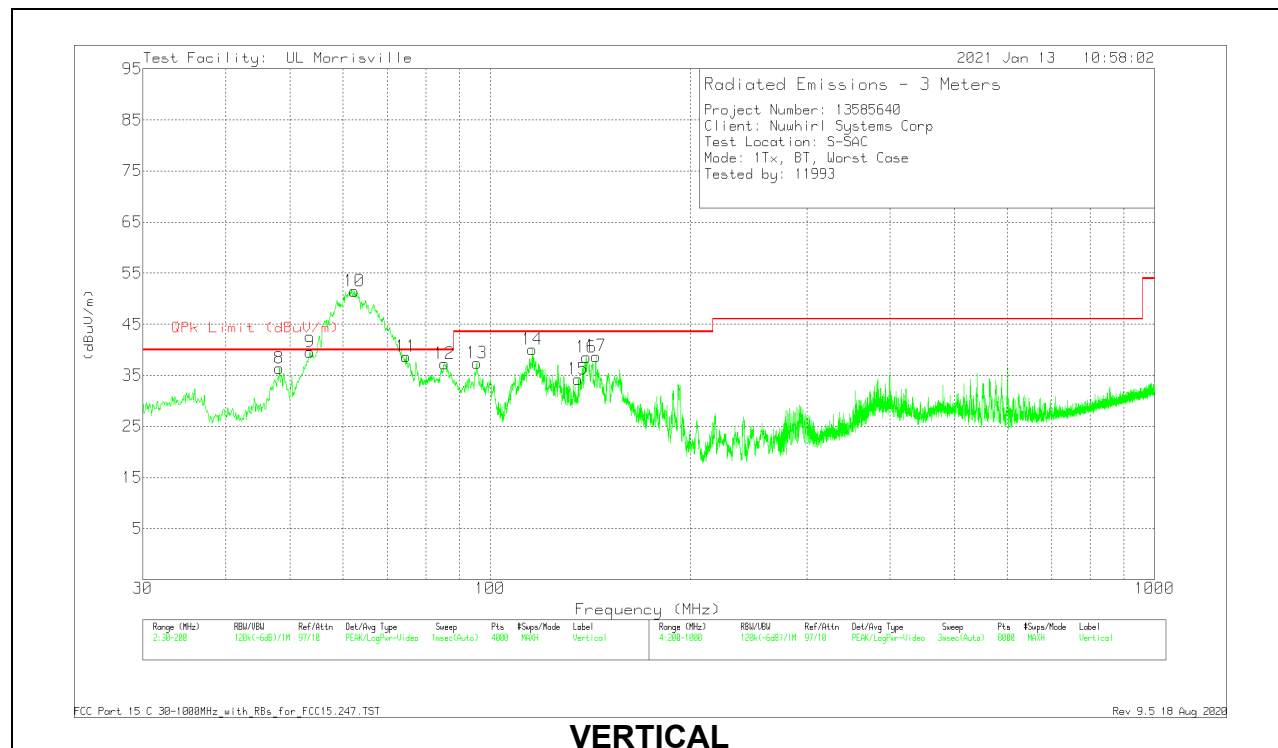
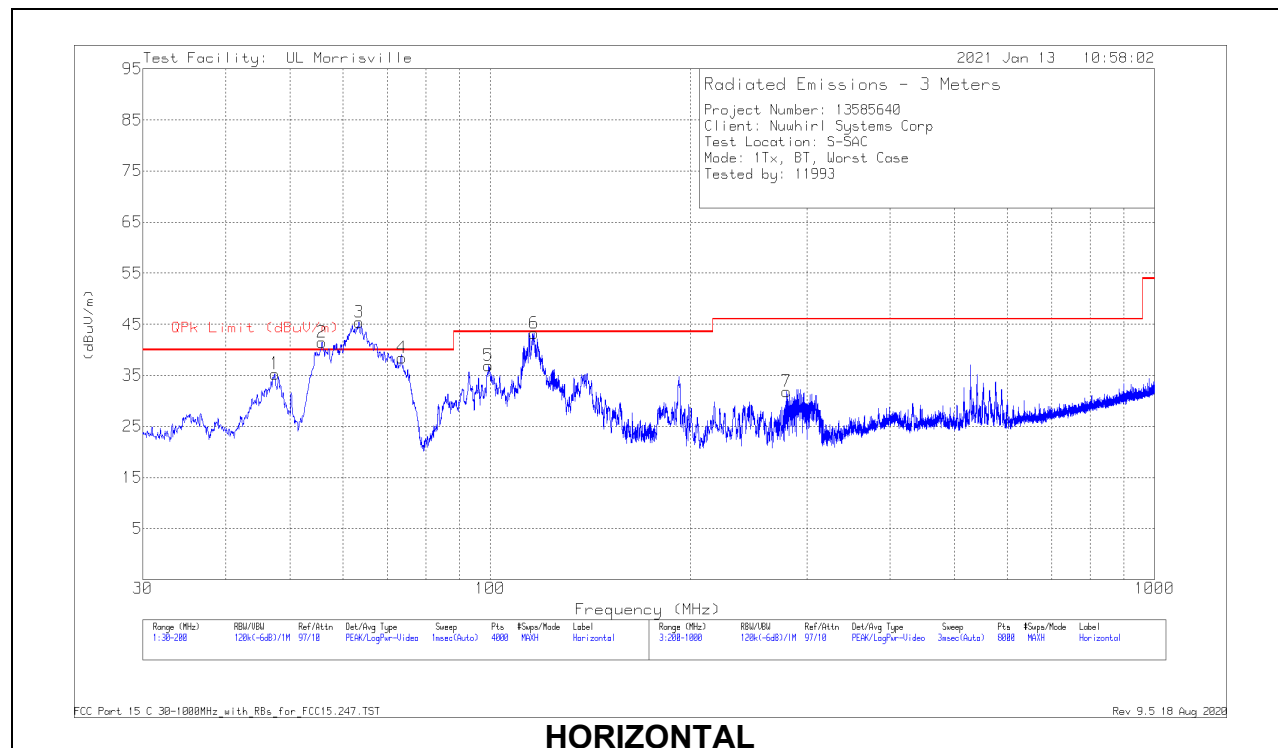
Face Position	Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Qp/Av Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
On	1	.01504	50.36	Pk	15.8	.1	-80	-13.74	44.06	64.06	-57.8	0-360
Off	2	.03016	47.97	Pk	13.3	.1	-80	-18.63	38.02	58.02	-56.65	0-360
Par	3	.06552	46.12	Pk	11.3	.1	-80	-22.48	31.28	51.28	-53.76	0-360
On	4	.24639	62.57	Pk	10.8	.1	-80	-6.53	19.77	39.77	-26.3	0-360
Off	5	.25438	62.23	Pk	10.7	.1	-80	-6.97	19.49	39.49	-26.46	0-360
Par	6	.25676	62.41	Pk	10.7	.1	-80	-6.79	19.41	39.41	-26.2	0-360
On	7	.66272	54.91	Qp	10.8	.2	-40	25.91	31.18	-	-5.27	133
On	8	.90822	51.46	Qp	10.9	.2	-40	22.56	28.44	-	-5.88	92
On	9	13.56382	24.87	Pk	10.4	.7	-40	-4.03	29.54	-	-33.57	0-360
Off	10	.65916	55.47	Qp	10.8	.2	-40	26.47	31.22	-	-4.75	140
Off	11	.90989	54.46	Qp	10.9	.2	-40	25.56	28.42	-	-2.86	19
Off	12	2.72659	30.16	Pk	11.1	.3	-40	1.56	29.54	-	-27.98	0-360
Par	13	.66138	58	Qp	10.8	.2	-40	29	31.2	-	-2.2	279
Par	14	.91442	47.99	Qp	10.9	.2	-40	19.09	28.38	-	-9.29	28
Par	15	13.56065	23.42	Pk	10.4	.7	-40	-5.48	29.54	-	-35.02	0-360

Pk - Peak detector

Qp - Quasi-Peak detector

10.3. WORST CASE BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 73.3763	47.12	Qp	14.4	-30.9	30.62	40	-9.38	160	226	H
6	** 116.1849	46.98	Qp	19.7	-30.3	36.38	43.52	-7.14	272	222	H
11	** 74.5942	49.65	Qp	14.3	-30.9	33.05	40	-6.95	126	106	V
14	** 115.7752	43.76	Qp	19.7	-30.3	33.16	43.52	-10.36	84	105	V
15	** 135.6823	44.92	Pk	19.5	-30.2	34.22	43.52	-9.3	0-360	101	V
7	** 279.6103	41.35	Pk	19.4	-28.9	31.85	46.02	-14.17	0-360	101	H
1	47.387	51.51	Pk	15.1	-31.3	35.31	-	-	0-360	399	H
8	48.1522	52.83	Pk	14.8	-31.2	36.43	-	-	0-360	101	V
9	53.5511	57.31	Pk	13.5	-31.2	39.61	-	-	0-360	101	V
2	55.8254	59.1	Pk	13.5	-31.1	41.5	-	-	0-360	300	H
10	62.3934	68.6	Pk	13.9	-31	51.5	-	-	0-360	101	V
3	63.4562	62.65	Pk	13.9	-31.1	45.45	-	-	0-360	399	H
12	85.3706	54.37	Pk	13.6	-30.7	37.27	-	-	0-360	101	V
13	95.4669	51.85	Pk	16.1	-30.6	37.35	-	-	0-360	101	V
5	99.4417	51.28	Pk	16.2	-30.6	36.88	-	-	0-360	300	H
16	139.5508	49.59	Pk	19.1	-30.1	38.59	-	-	0-360	101	V
17	144.2271	49.94	Pk	18.9	-30.1	38.74	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

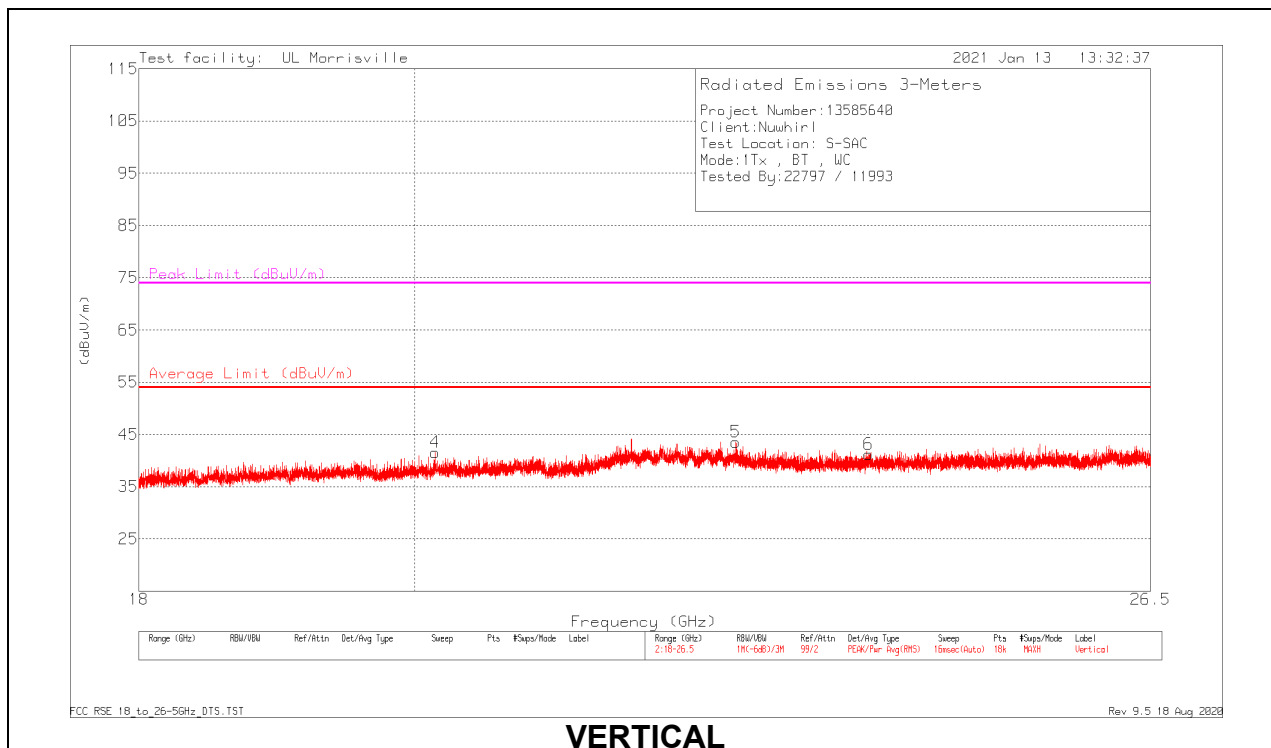
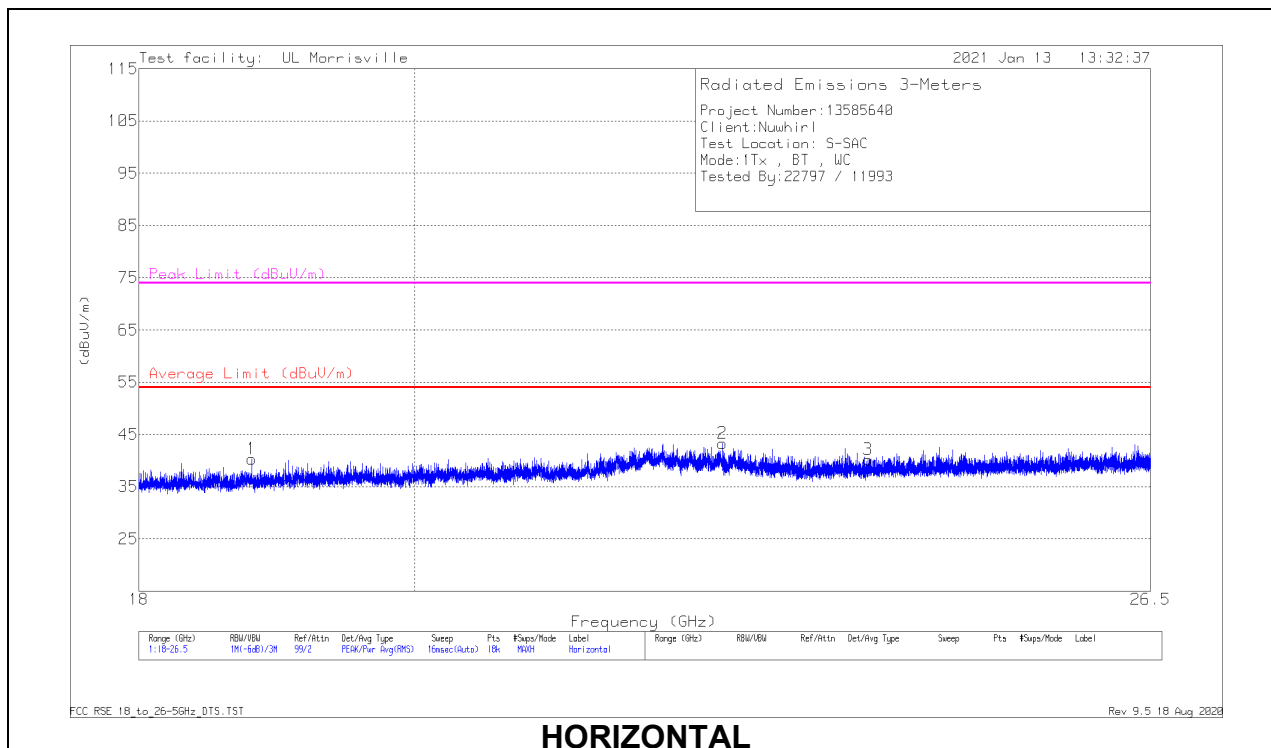
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

10.4. WORST CASE 18-26 GHZ

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0063 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 18.79527	46.57	Pk	33.2	-39.5	40.27	54	-13.73	74	-33.73	0-360	300	H
2	* ** 22.49911	45.81	Pk	36.4	-38.9	43.31	54	-10.69	74	-30.69	0-360	300	H
3	* ** 23.78409	43.98	Pk	34.8	-38.6	40.18	54	-13.82	74	-33.82	0-360	300	H
4	* ** 20.15676	46.58	Pk	33.7	-38.7	41.58	54	-12.42	74	-32.42	0-360	250	V
5	* ** 22.61622	46.25	Pk	36.1	-38.8	43.55	54	-10.45	74	-30.45	0-360	101	V
6	* ** 23.79448	44.84	Pk	34.8	-38.5	41.14	54	-12.86	74	-32.86	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

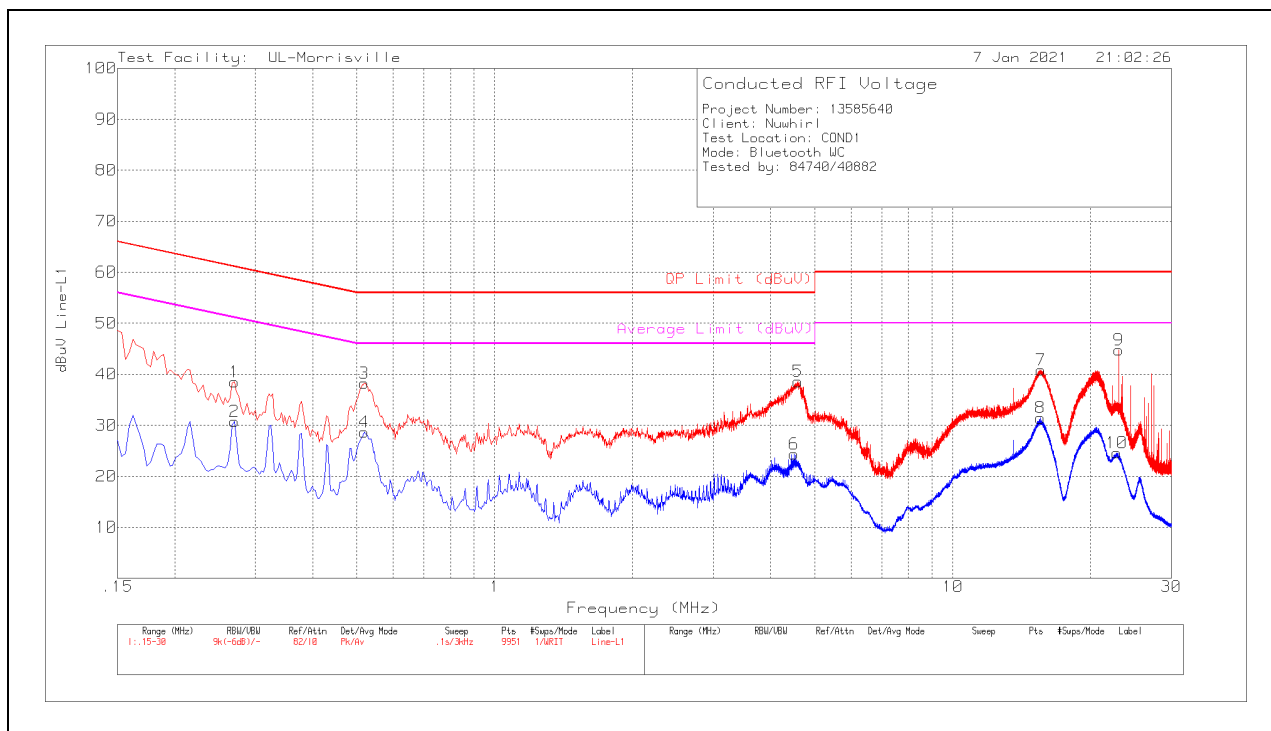
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

11.1.1. AC Power Line Norm

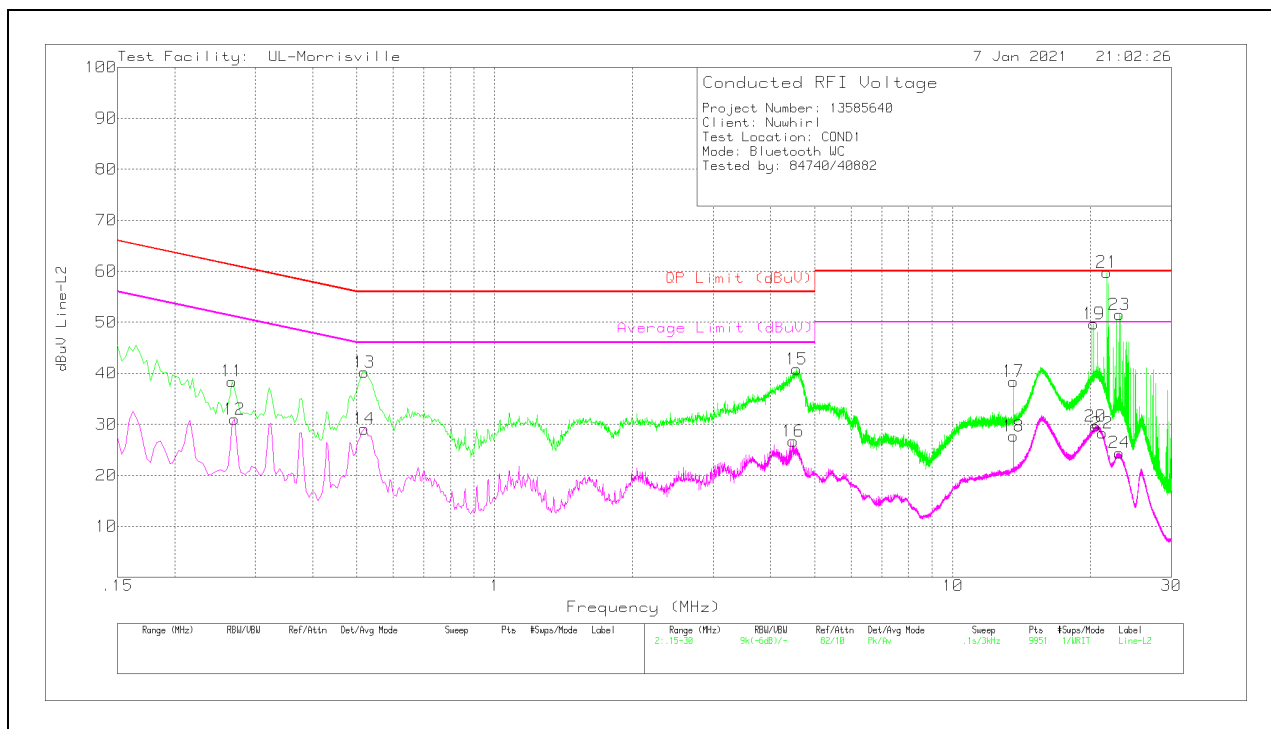
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBUV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBUV	QP Limit (dBUV)	Margin (dB)	Average Limit (dBUV)	Margin (dB)
1	.27	28.68	Pk	.1	9.7	38.48	61.12	-22.64	-	-
2	.27	20.91	Av	.1	9.7	30.71	-	-	51.12	-20.41
3	.519	28.46	Pk	0	9.8	38.26	56	-17.74	-	-
4	.519	18.85	Av	0	9.8	28.65	-	-	46	-17.35
5	4.584	28.67	Pk	0	9.9	38.57	56	-17.43	-	-
6	4.5	14.46	Av	0	9.9	24.36	-	-	46	-21.64
7	15.57	30.61	Pk	.1	10.1	40.81	60	-19.19	-	-
8	15.543	21.24	Av	.1	10.1	31.44	-	-	50	-18.56
9	23.04	34.43	Pk	.2	10.1	44.73	60	-15.27	-	-
10	22.785	14.3	Av	.2	10.1	24.6	-	-	50	-25.4

Pk - Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
11	.267	28.63	Pk	.1	9.7	38.43	61.21	-22.78	-	-
12	.27	21.21	Av	.1	9.7	31.01	-	-	51.12	-20.11
13	.519	30.31	Pk	.1	9.8	40.21	56	-15.79	-	-
14	.519	19.21	Av	.1	9.8	29.11	-	-	46	-16.89
15	4.563	30.82	Pk	.1	9.9	40.82	56	-15.18	-	-
16	4.482	16.71	Av	.1	9.9	26.71	-	-	46	-19.29
17	13.56	28.31	Pk	.1	10	38.41	60	-21.59	-	-
18	13.56	17.58	Av	.1	10	27.68	-	-	50	-22.32
19	20.325	39.41	Pk	.2	10.1	49.71	60	-10.29	-	-
20	20.502	19.32	Av	.2	10.1	29.62	-	-	50	-20.38
21	21.6883	19.55	Qp	.2	10.1	29.85	60	-30.15	-	-
22	21.204	17.99	Av	.2	10.1	28.29	-	-	50	-21.71
23	23.097	41.22	Pk	.2	10.1	51.52	60	-8.48	-	-
24	23.097	14.12	Av	.2	10.1	24.42	-	-	50	-25.58

Pk - Peak detector
Av - Average detection
Qp - Quasi-Peak detector

12. SETUP PHOTOS

Please refer to R13585640-EP1 for setup photos

END OF TEST REPORT