



TEST REPORT

Report Number.: 13646814-E5V5

Applicant : Bently Nevada LLC
1631 BENTLY PARKWAY SOUTH
MINDEN NV, 89423 U.S.A.

Model : 147M7136-02-01

Brand : Bently Nevada Asset Condition Monitoring

EUT Description : RangerPro tri-axial sensor

Test Standard(s) : LP0002:2020

Date of Issue:

November 01, 2021

Prepared by:

UL VERIFICATION SERVICES
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	6/30/2021	Initial Issue	---
V2	9/10/2021	EUT Description and Brand updated Section 1 updated Section 6.3 updated Section 6.5 updated Section 6.6 updated Section 10.2	Henry Lau
V3	9/22/2021	Section 6.6 updated	Henry Lau
V4	9/28/2021	Section 6.5 updated	Henry Lau
V5	11/1/2021	Section 6.6 updated (specification of accessory)	Dan Corona

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Bently Nevada LLC
1631 BENTLY PARKWAY SOUTH
MINDEN NV, 89423 U.S.A.

EUT DESCRIPTION: RangerPro tri-axial sensor

MODEL: 147M7136-02-01

BRAND: Bently Nevada Asset Condition Monitoring

SERIAL NUMBER: Conducted: 82E00DCB
Radiated: AD21AXBN

SAMPLE RECEIPT DATE: May 12 & 17, 2021

DATE TESTED: JUNE 01 – JUNE 8, 2021

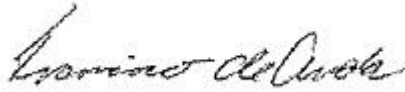
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
LP0002: 2020	Complies

UL Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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2. SUMMARY TABLE

This report contains data provided by the customer, which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

LP0002 Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
4.10.1.6(2A)	6dB BW	Complies	None.
4.10.1.2(1C)	Output Power	Complies	None.
See Comment	Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
4.10.1.6(2B)	PSD	Complies	None.
4.10.1.5(1) or (2)	Conducted Spurious Emissions	Complies	None.
3.5, 3.6, 3.9	Radiated Emissions	Complies	None.
3.3	AC Mains Conducted Emissions	Not Applicable	EUT is battery powered

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with LP0002: 2020, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, and KDB 414788 D01 Radiated Test Site v01r01.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	208313
☐	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	22541	208313
☒	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A	US0104	2324B	208313

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Ranger Pro Wireless Condition Monitoring Device with an 2.4GHz Zigbee radio. It is battery operated only.

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)
2405 - 2475	Zigbee	5.13	3.26

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer are as follows:

Frequency range	Antenna type	Brand	Model	Maximum gain
2405~2475MHz	patch	TAOGLAS	SWLP.2450.12.4.B.02	2.0 dBi

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 03.01.10.02.
The test utility software used during testing was VP2000 Radio Test Version 1.1.1.8.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz 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.

Radiated Testing was performed with a brand new Xeno Energy battery model: Xeno XL-205F as final case.

The fundamental of the EUT was investigated in two orthogonal orientations X & Y. It was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Worst-case data rate as provided by the client was 250kbps.

Frequency(MHz)	Modulation type	Power setting
2405	Zigbee OQPSK	EUT Default
2440	Zigbee OQPSK	EUT Default
2475	Zigbee OQPSK	EUT Default

Note:

The EUT was operating by LiSoCl₂ - D-cell battery model Xeno XL-205F at 3.6V; therefore, the AC Power Line Conducted test is not applicable.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	T460s	PBFBKHK
DC Power Supply	TDK.Lambda	GENH60-25	08H7946V
NFC Reader	Identiv	3700 F	55021722296842
Battery 3	Xeno Energy	Xeno XL-205F	Xeno Energy
Specification of Accessory			
Description	Manufacturer	Model	Brand name
Battery 1	Tadiran	TLH-5930	Tadiran
Battery 2	Tadiran	TL-5930	Tadiran
Battery 3	Xeno Energy	Xeno XL-205F	Xeno Energy
Battery 4	Tadiran	SL-2780	Tadiran

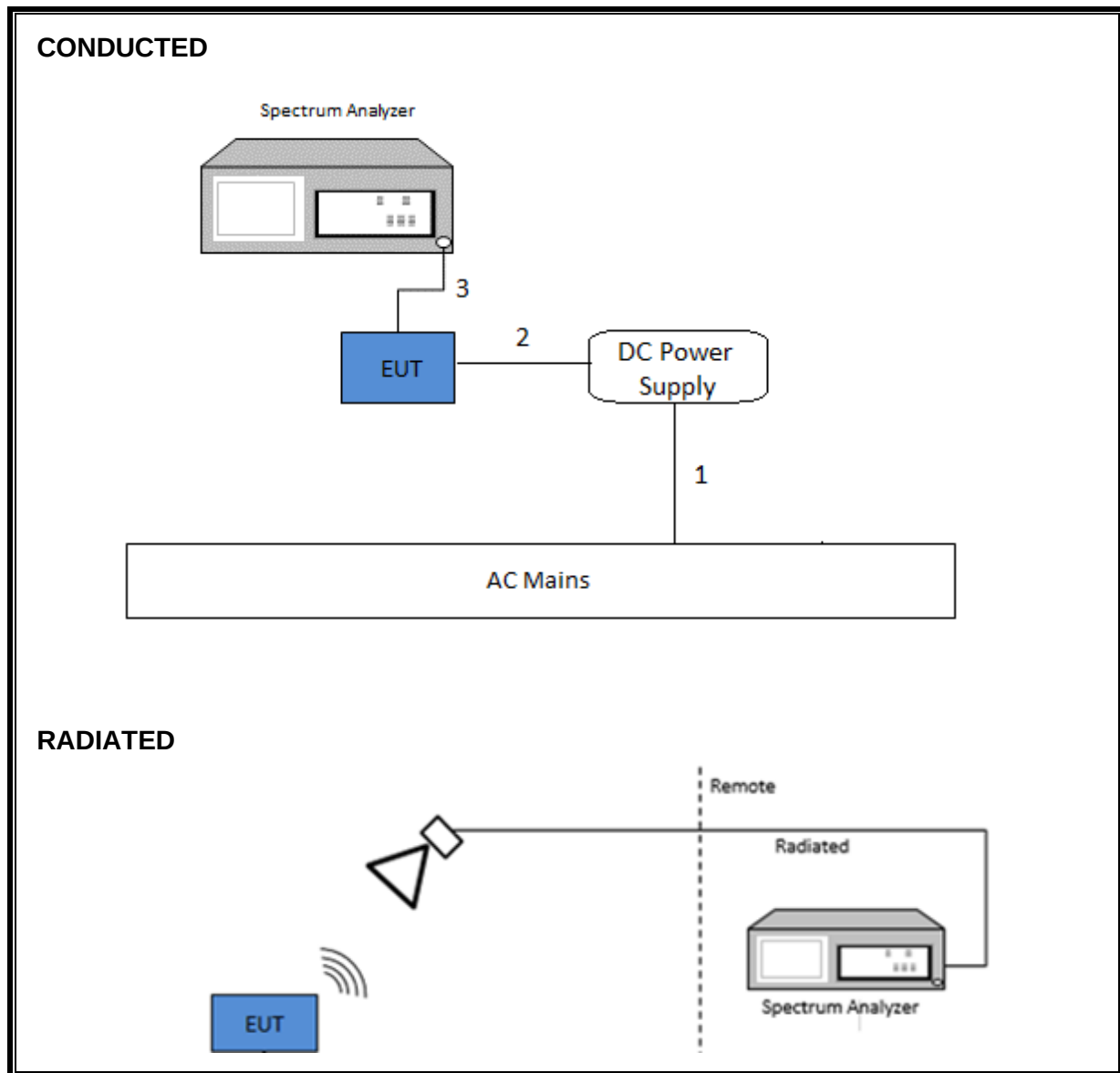
I/O CABLES (CONDUCTED)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	1.5	AC Main to DC Supply, to Analyzer
2	DC	1	DC	Unshielded	0.5	Power Supply to EUT
3	Antenna Port	1	SMA	Unshielded	0.1	EUT to Analyzer

TEST SETUP

A laptop and NFC Reader are used to program the EUT and removed during actual testing. For conducted testing the EUT was powered by external DC PS, for radiated testing the EUT was powered by batteries. Test software exercised the radio card.

SETUP DIAGRAMS



7. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Subclause -11.8.1

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

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

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

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Section 6.10

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	8/31/2021	8/31/2020
Amplifier, 100MHz-18GHz	AMPLICAL	AMP0.1G18-47-20	PRE0197319	4/8/2022	4/8/2021
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	T477	9/24/2021	9/24/2020
Amplifier, 10KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	175953	1/21/2022	1/21/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	2/21/2022	2/21/2021
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	PRE0179466	6/8/2022	6/8/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	PRE0179468	6/8/2022	6/8/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T342	1/25/2022	1/25/2021
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight Technologies Inc	E4446A	T198	5/13/2022	5/13/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1227	3/16/2022	3/16/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1262	1/27/2022	1/27/2021
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	T447	9/24/2021	9/24/2020
Rf Amplifier, 18-26.5GHz, 60dB gain	AMPLICAL	AMP18G26.5-60	171590	5/21/2022	5/21/2021
Test Software List					
Description	Manufacturer	Model	Version		
Radiated Software	UL	UL EMC	Ver 9.5, 30 Apr 2020		
Antenna Port Software	UL	UL RF	AP2021.5.13		

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

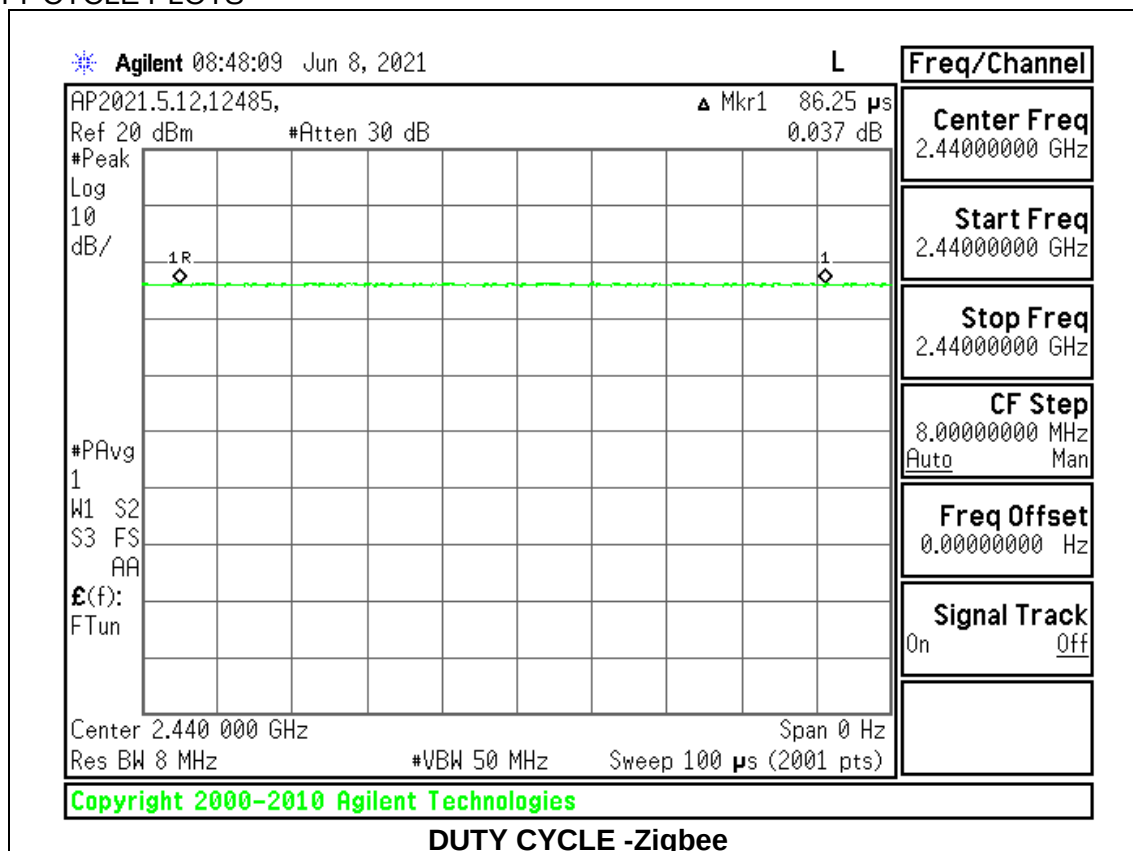
PROCEDURE

ANSI C63.10 Subclause -11.6. Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
Zigbee	100.00	100.00	1.00	100.00	0.00	0.010

DUTY CYCLE PLOTS



9.2. 6 dB BANDWIDTH

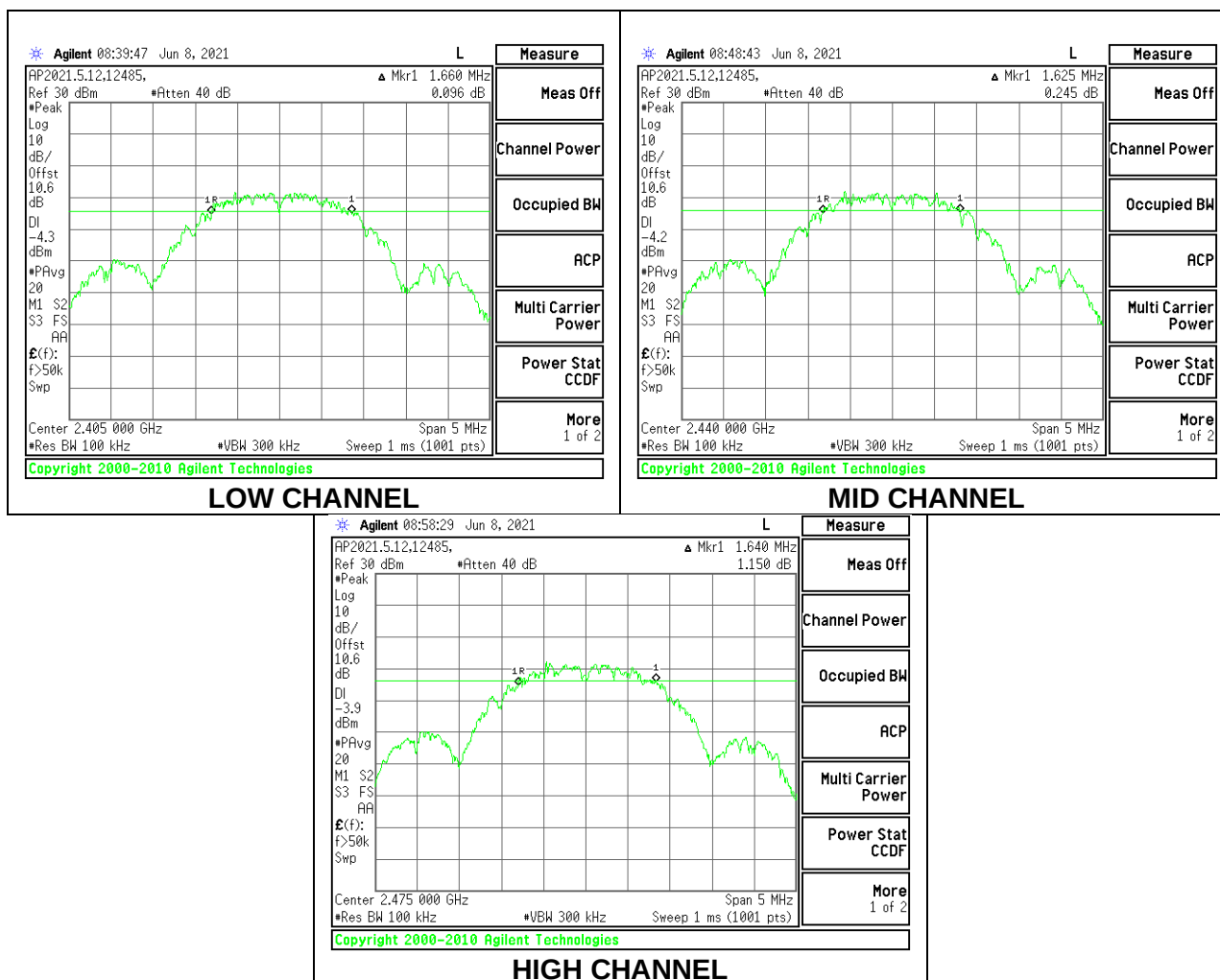
LIMITS

LP0002 Clause 4.10.1.6(2A)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2405	1.660	0.5
Middle	2440	1.625	0.5
High	2475	1.640	0.5



9.3. OUTPUT POWER

LIMIT

LP0002 Clause 4.10.1.2(1C)

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

TEST PROCEDURE

Measurements perform using a wideband RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband peak power sensor. Peak output power was read directly from the power meter.

RESULTS

Tested By:	12485 GA
Date:	6/1/2021

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	3.86	30	-26.140
Middle	2440	4.63	30	-25.370
High	2475	5.13	30	-24.870

9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from the power meter.

RESULTS

Tested By:	12485 GA
Date:	6/1/2021

Channel	Frequency (MHz)	AV power (dBm)
Low	2405	2.67
Middle	2440	3.61
High	2475	4.12

9.5. POWER SPECTRAL DENSITY

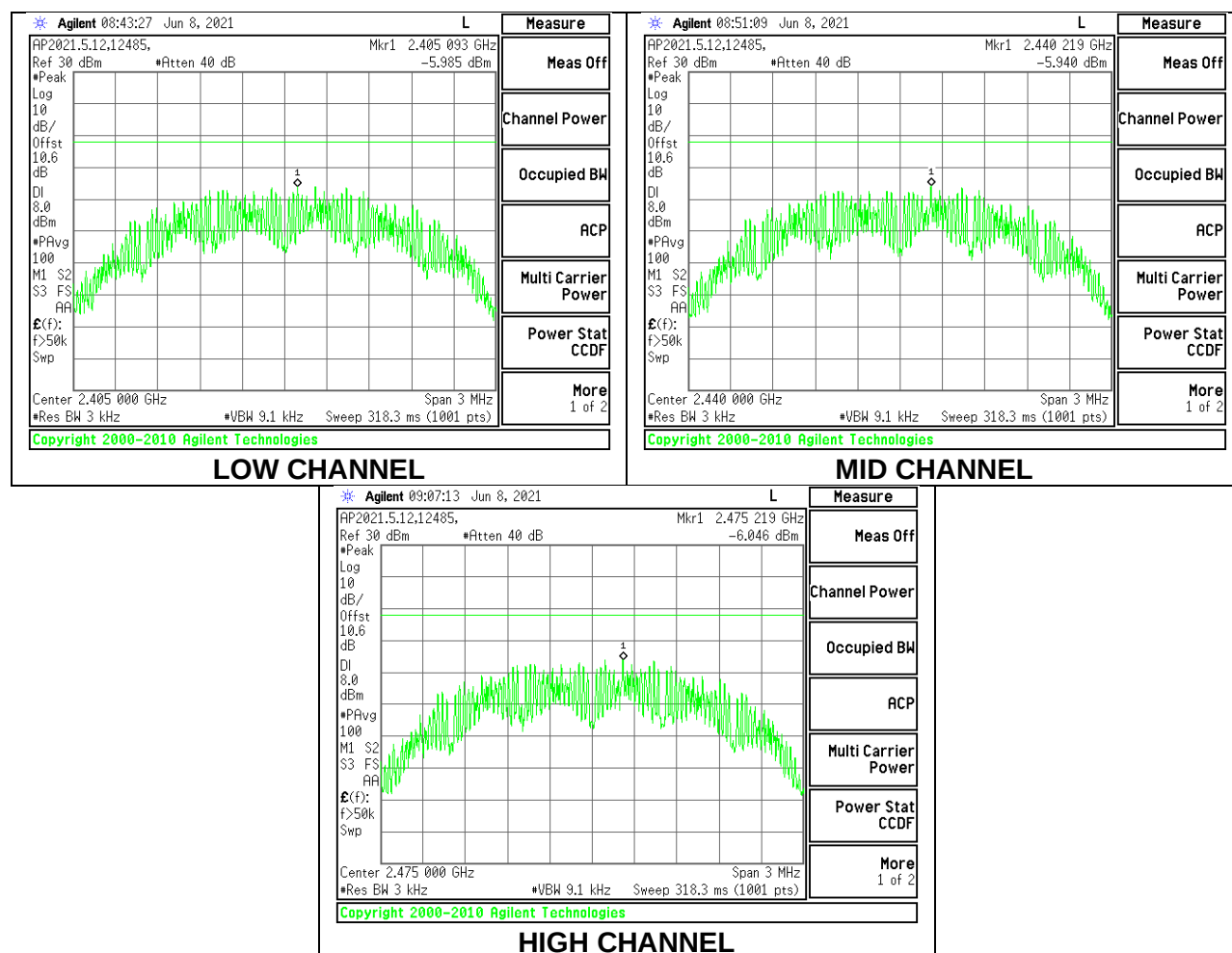
LIMITS

LP0002 Clause 4.10.1.6(2B)

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

RESULTS

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2405	-5.99	8	-13.99
Middle	2440	-5.94	8	-13.94
High	2475	-6.05	8	-14.05



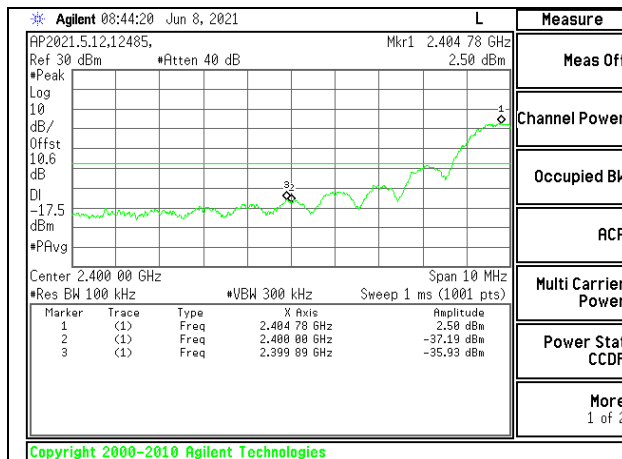
9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

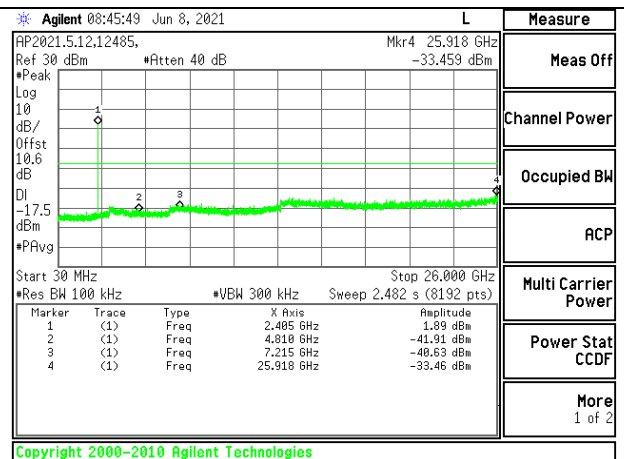
LP0002 Clause 4.10.1.5(1)

Output power was measured based on the use of a peak measurement; therefore, spurious emissions are required to be 20 dBc.

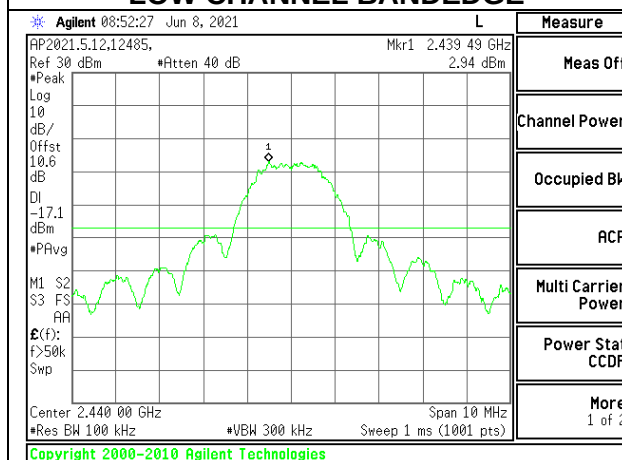
RESULTS



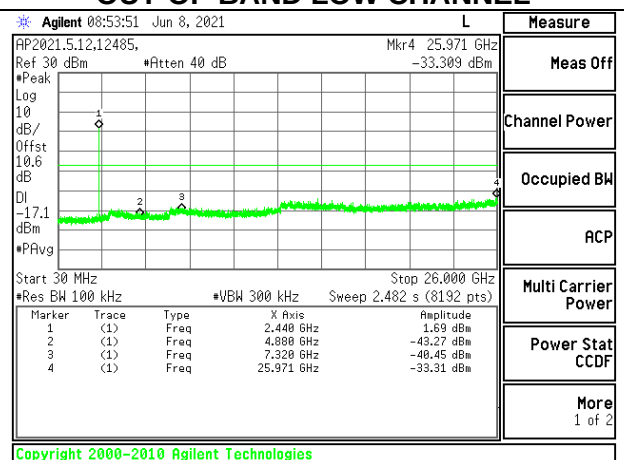
LOW CHANNEL BANDEDGE



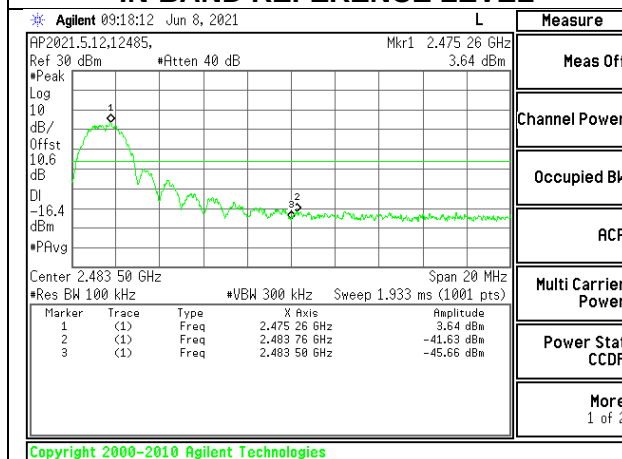
OUT-OF-BAND LOW CHANNEL



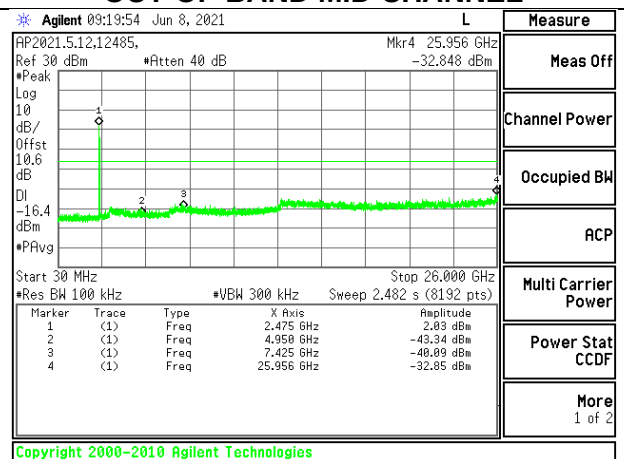
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

LP0002 Clause 3.5, 3.6, 3.9

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 as applicable 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.

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

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

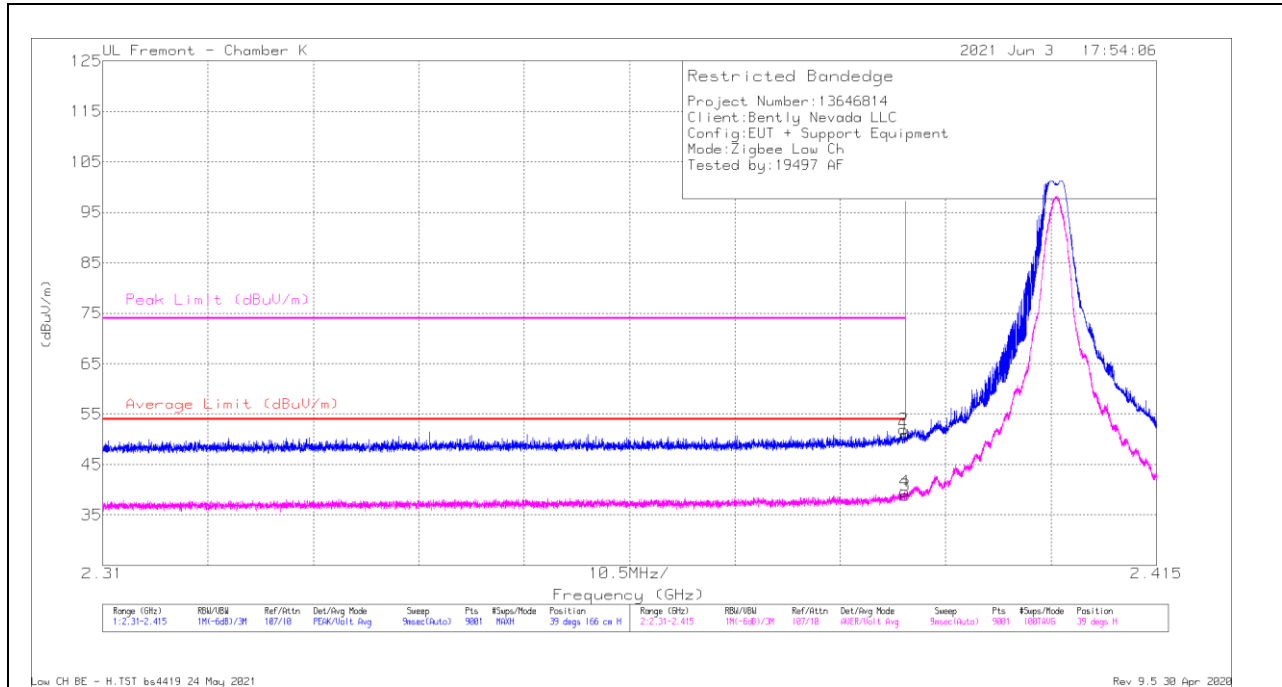
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

NOTE: The 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 377 Ohms. For example the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to $Y - 51.5 = Z$ dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

10.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



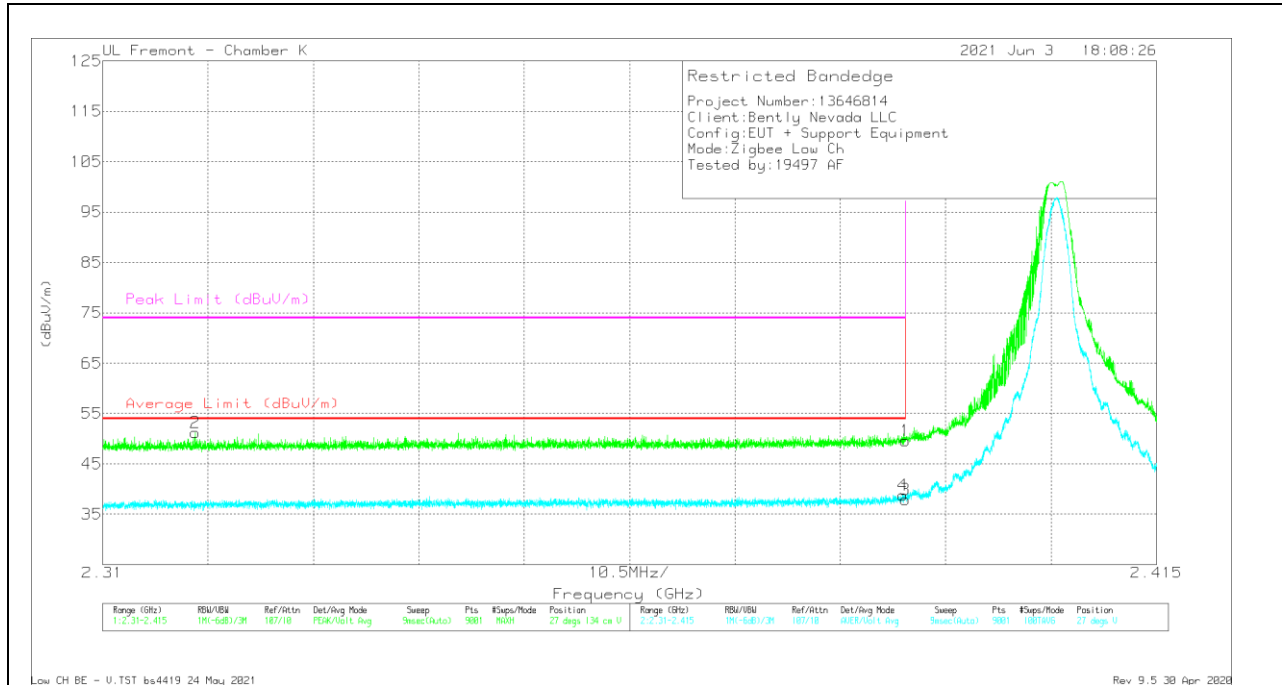
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	2.38999	40.89	Av	32.4	-34.4	0	38.89	54	-15.11	-	-	39	166
4	2.38993	41.68	Av	32.4	-34.4	0	39.68	54	-14.32	-	-	39	166
1	2.38999	52.98	PK	32.4	-34.4	0	50.98	-	-	74	-23.02	39	166
2	2.38979	53.9	PK	32.4	-34.4	0	51.9	-	-	74	-22.1	39	166

* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK - Peak detector

RMS - RMS detection

VERTICAL RESULT

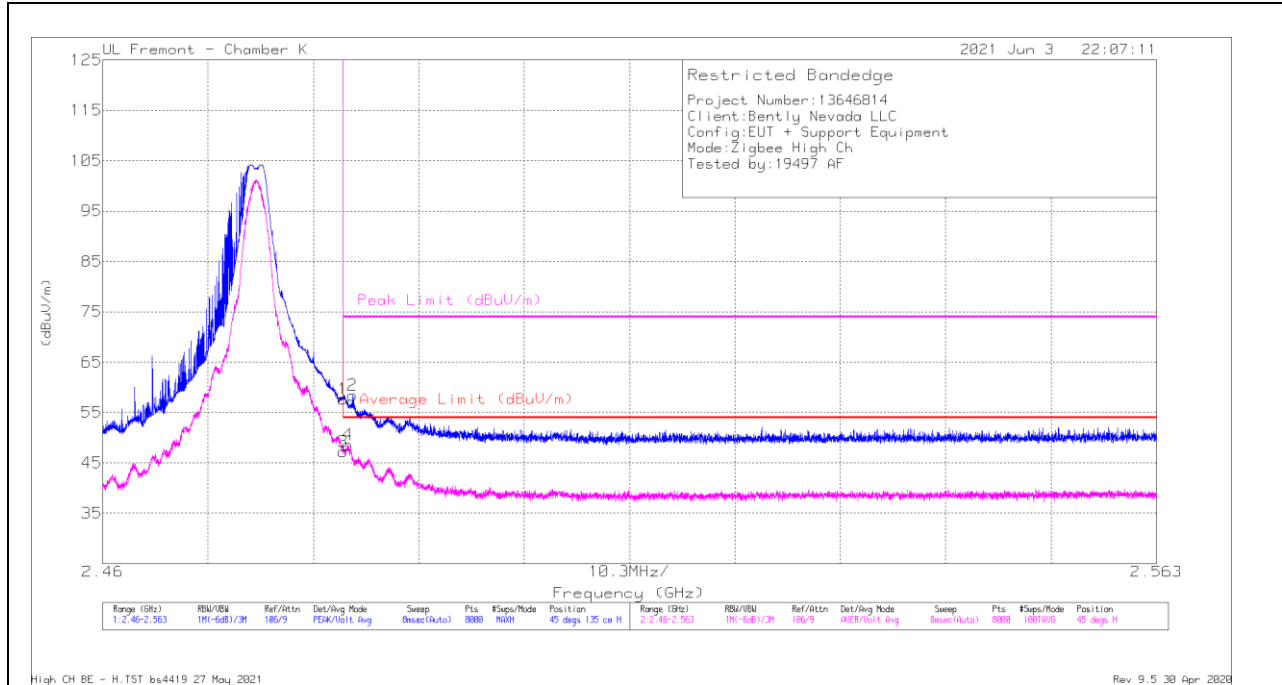


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	2.38999	39.93	Av	32.4	-34.4	0	37.93	54	-16.07	-	-	27	134
4	2.38973	40.78	Av	32.4	-34.4	0	38.78	54	-15.22	-	-	27	134
1	2.38999	51.62	PK	32.4	-34.4	0	49.62	-	-	74	-24.38	27	134
2	2.31921	53.93	PK	32	-34.7	0	51.23	-	-	74	-22.77	27	134

* - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK - Peak detector
RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



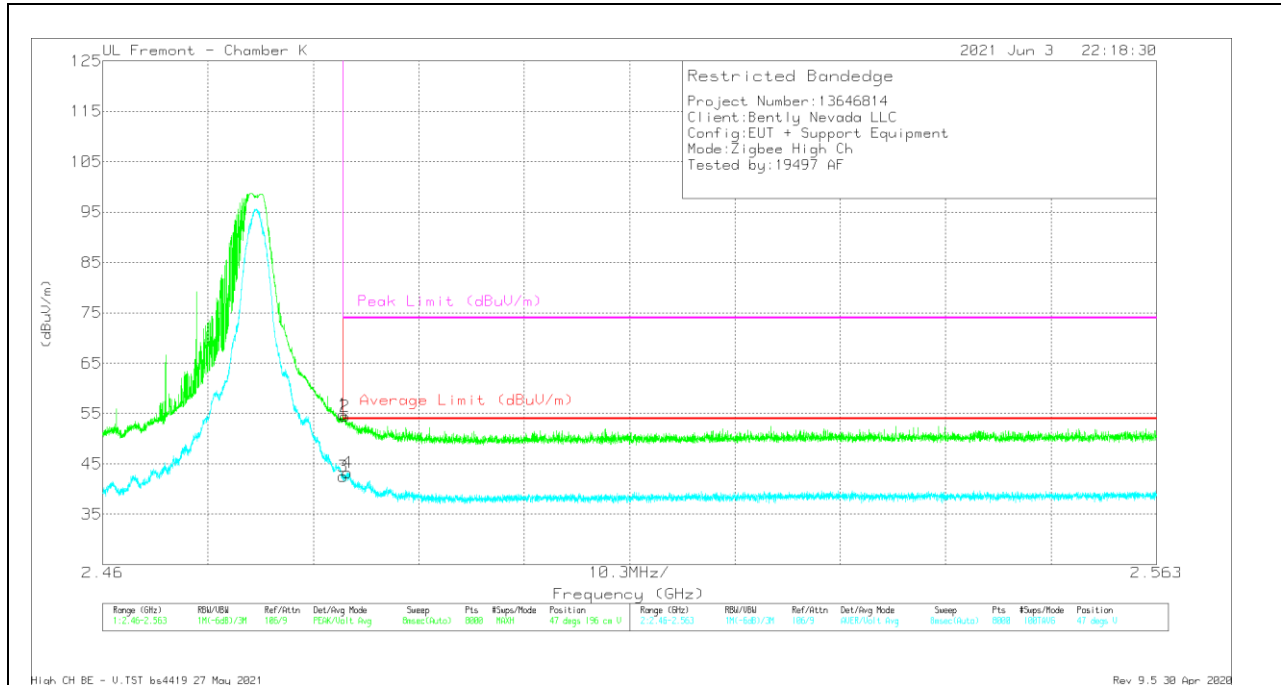
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	2.4835	25.58	Av	32.5	-10.9	0	47.18	54	-6.82	-	-	45	135
4	2.48396	27	Av	32.5	-10.9	0	48.6	54	-5.4	-	-	45	135
1	2.4835	36.09	Pk	32.5	-10.9	0	57.69	-	-	74	-16.31	45	135
2	2.4844	36.85	Pk	32.5	-10.9	0	58.45	-	-	74	-15.55	45	135

* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 2.4835	20.88	Av	32.5	-10.9	0	42.48	54	-11.52	-	-	47	196
4	* 2.48394	21.7	Av	32.5	-10.9	0	43.3	54	-10.7	-	-	47	196
1	* 2.4835	33.16	PK	32.5	-10.9	0	54.76	-	-	74	-19.24	47	196
2	* 2.48367	32.8	PK	32.5	-10.9	0	54.4	-	-	74	-19.6	47	196

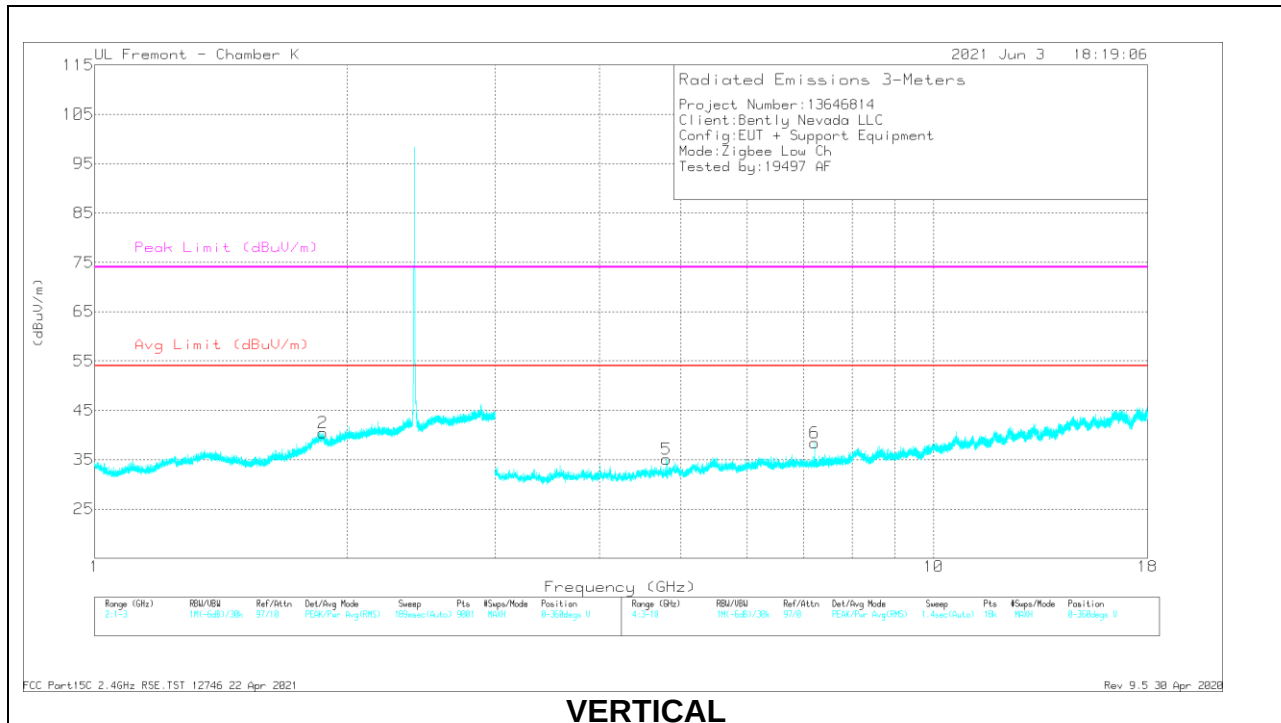
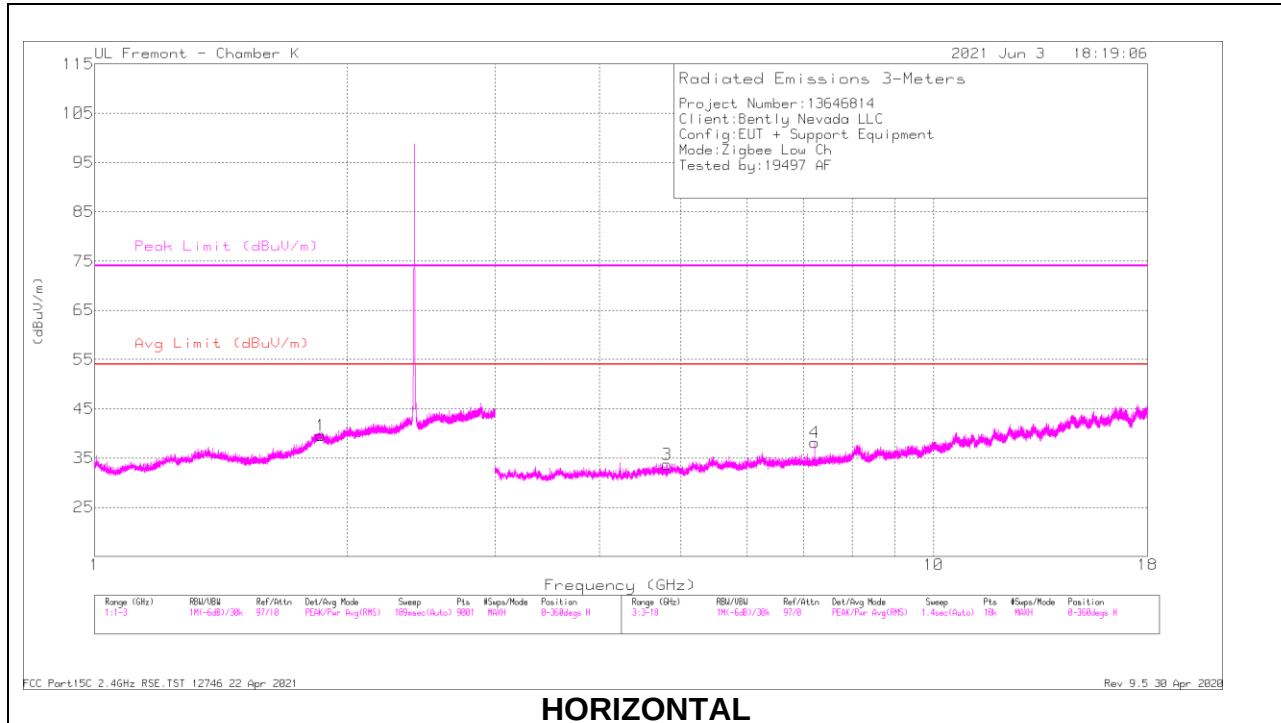
* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



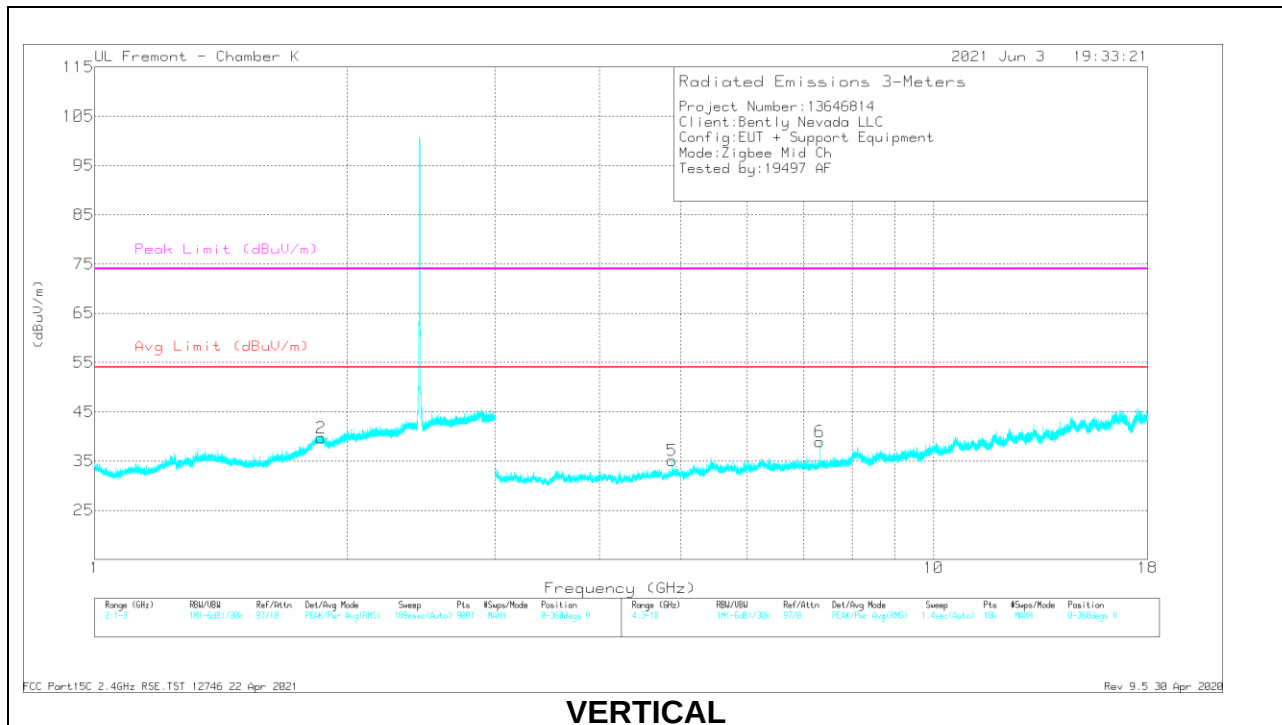
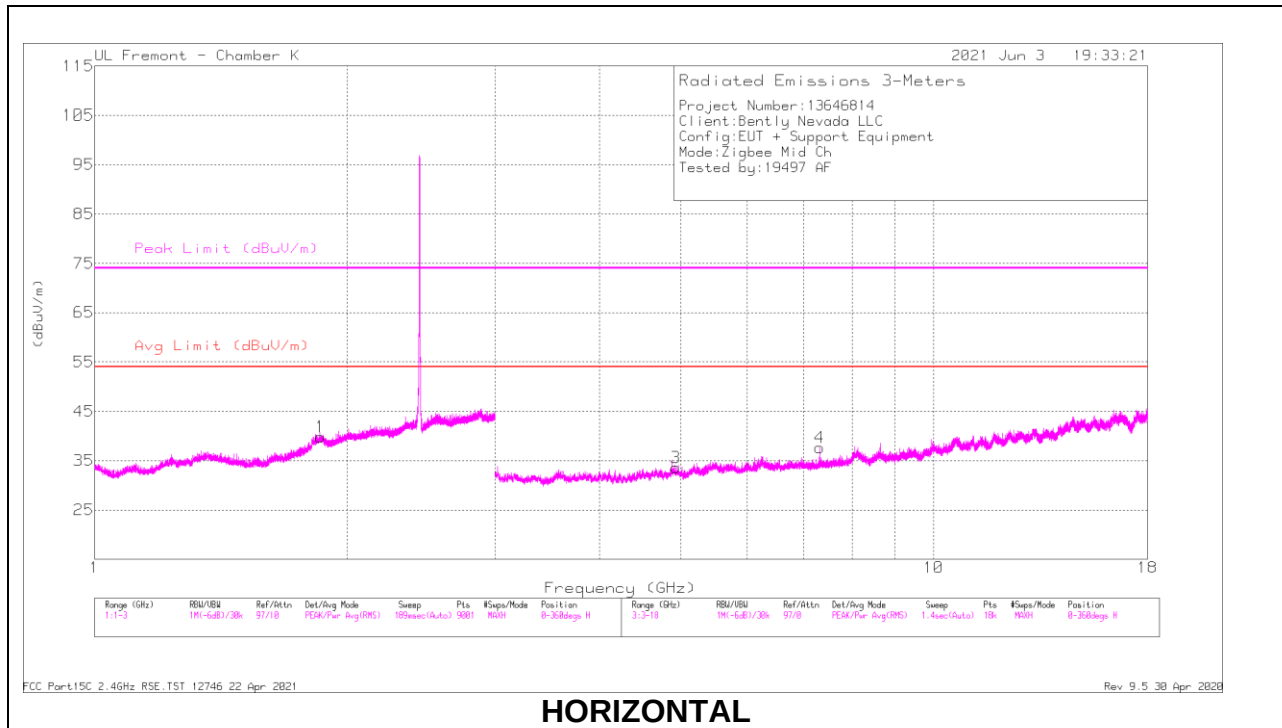
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/FI tr/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	* 1.86063	29.7	PK2	30.8	-12.1	0	48.4	-	-	74	-25.6	108	133	H
	* 1.86283	18.36	ADV	30.8	-12.1	0	37.06	54	-25.6	-	-	108	133	H
2	* 1.87377	29.42	PK2	31.1	-12.1	0	48.42	-	-	74	-25.58	193	114	V
	* 1.87267	18.63	ADV	31.1	-12.1	0	37.63	54	-16.37	-	-	193	114	V
3	* 4.80954	46.94	PK2	34.3	-39.9	0	41.34	-	-	74	-32.66	191	118	H
	* 4.80903	36.26	ADV	34.3	-39.9	0	30.66	54	-23.34	-	-	191	118	H
4	7.21631	47.49	PK2	36.1	-37.8	0	45.79	-	-	-	-	343	99	H
	7.2163	37.34	ADV	36.1	-37.8	0	35.64	-	-	-	-	343	99	H
5	* 4.80894	48.56	PK2	34.3	-39.9	0	42.96	-	-	74	-31.04	34	281	V
	* 4.80908	38.48	ADV	34.3	-39.9	0	32.88	54	-21.12	-	-	34	281	V
6	7.21663	47.12	PK2	36.1	-37.8	0	45.42	-	-	-	-	5	102	V
	7.21646	36.91	ADV	36.1	-37.8	0	35.21	-	-	-	-	5	102	V

* - indicates frequency in Taiwan NCC LP0002 Restricted Band
Marker 4 & 6 does not lie in the restricted band therefore limit does not apply

PK2 - KDB558074 Method: Maximum Peak
ADV - U-NII AD primary method, Linear Voltage Average

MID CHANNEL RESULTS



RADIATED EMISSIONS

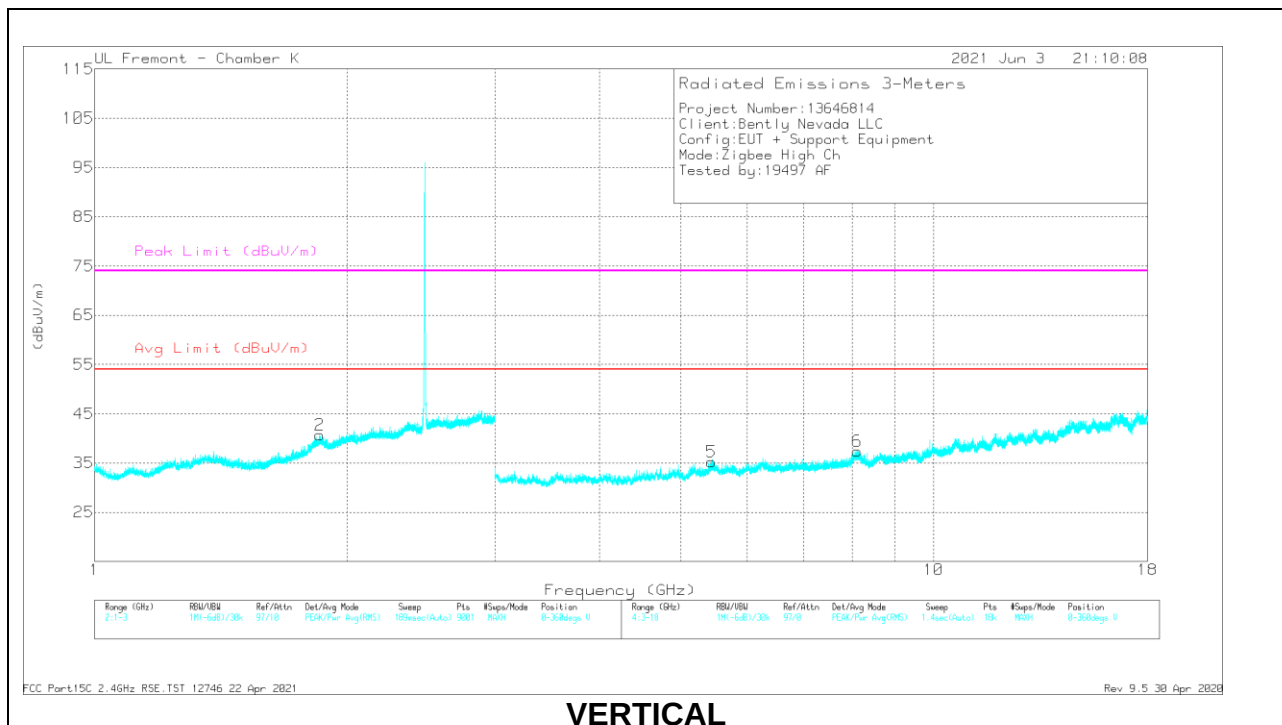
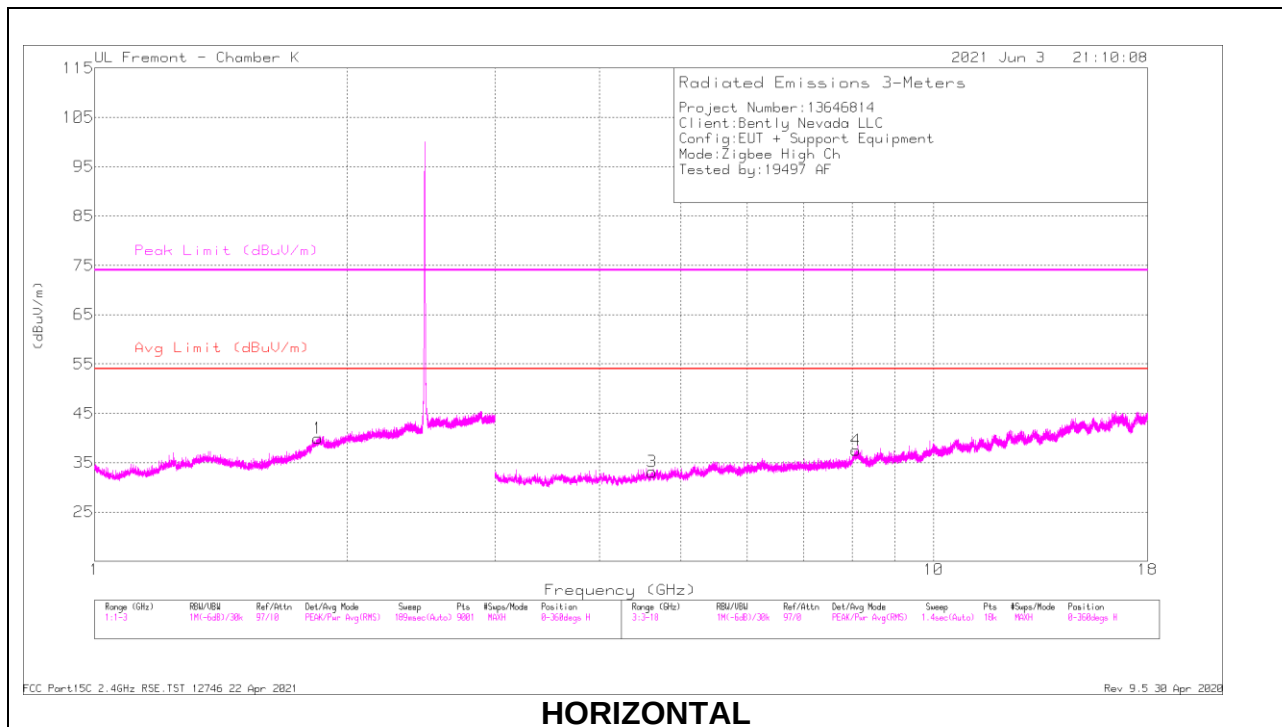
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.85831	30.17	PK2	30.8	-12.1	0	48.87	-	-	74	-25.13	344	122	H
	* 1.85927	18.4	ADV	30.8	-12.1	0	37.1	54	-16.9	-	-	344	122	H
2	* 1.86142	29.2	PK2	30.8	-12.1	0	47.9	-	-	74	-26.1	284	229	V
	* 1.86248	18.08	ADV	30.8	-12.1	0	36.78	54	-17.22	-	-	284	229	V
3	* 4.92582	47.06	PK2	34.4	-40	0	41.46	-	-	74	-32.54	49	341	H
	* 4.92877	35.23	ADV	34.4	-40	0	29.63	54	-24.37	-	-	49	341	H
4	* 7.31868	46.4	PK2	36	-37.4	0	45	-	-	74	-29	1	114	H
	* 7.31849	36.94	ADV	36	-37.4	0	35.54	54	-18.46	-	-	1	114	H
5	* 4.87888	47.66	PK2	34.4	-39.9	0	42.16	-	-	74	-31.84	14	270	V
	* 4.87911	37.3	ADV	34.4	-39.8	0	31.9	54	-22.1	-	-	14	270	V
6	* 7.32136	47.82	PK2	36	-37.4	0	46.42	-	-	74	-27.58	0	219	V
	* 7.32134	36.81	ADV	36	-37.4	0	35.41	54	-18.59	-	-	0	219	V

* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/FI tr/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	* 1.8468	28.95	PK2	30.7	-12.2	0	47.45	-	-	74	-26.55	153	353	H
	* 1.84859	18.09	ADV	30.8	-12.2	0	36.69	54	-17.31	-	-	153	353	H
2	* 1.85423	29.14	PK2	30.9	-12.1	0	47.94	-	-	74	-26.06	149	129	V
	* 1.85542	18.27	ADV	30.9	-12.1	0	37.07	54	-16.93	-	-	149	129	V
3	* 4.61904	47.48	PK2	34.4	-40.7	0	41.18	-	-	74	-32.82	251	144	H
	* 4.61648	35.83	ADV	34.4	-40.8	0	29.43	54	-24.57	-	-	251	144	H
4	* 8.08788	45.7	PK2	36	-36.6	0	45.1	-	-	74	-28.9	211	316	H
	* 8.08982	33.81	ADV	36	-36.6	0	33.21	54	-20.79	-	-	211	316	H
5	* 5.43912	47.62	PK2	35.6	-39.3	0	43.92	-	-	74	-30.08	47	150	V
	* 5.44044	34.97	ADV	35.6	-39.3	0	31.27	54	-22.73	-	-	47	150	V
6	* 8.1212	46.1	PK2	36	-36.6	0	45.5	-	-	74	-28.5	297	121	V
	* 8.11746	34.37	ADV	36	-36.5	0	33.87	54	-20.13	-	-	297	121	V

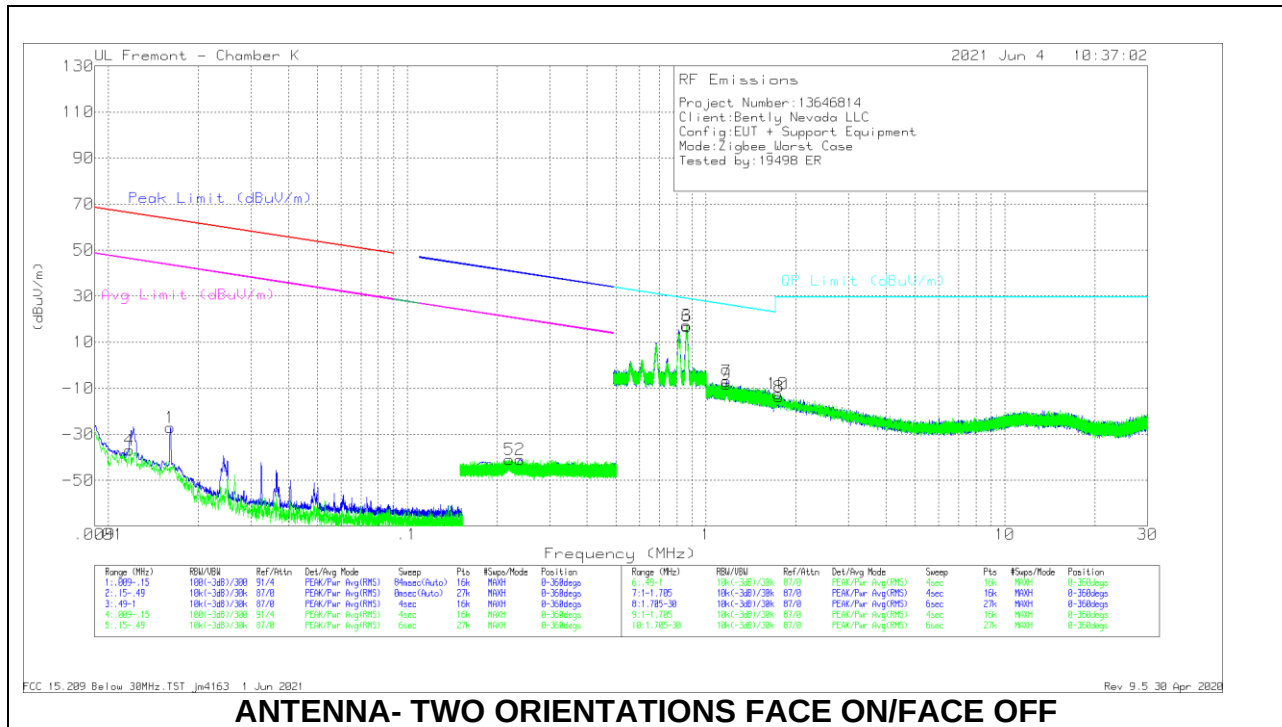
* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

10.3. WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01614	25.12	Pk	59.5	-31.8	-80	-27.18	63.43	-90.61	43.43	-70.61	0-360
2	.23908	14.98	Pk	56.2	-32.2	-80	-41.02	40.04	-81.06	20.04	-61.06	0-360
4	.01177	14.21	Pk	60.2	-31.4	-80	-36.99	66.17	-103.16	46.17	-83.16	0-360
5	.22019	14.98	Pk	56.2	-32.2	-80	-41.02	40.76	-81.78	20.76	-61.78	0-360

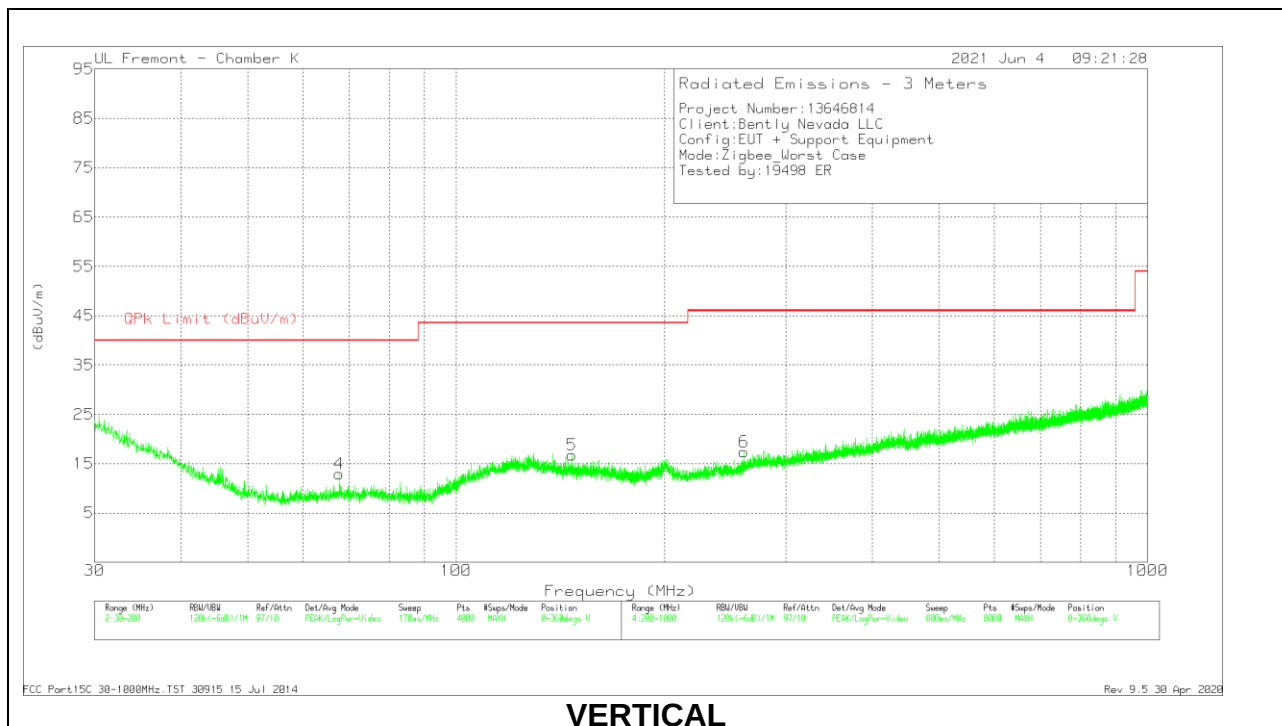
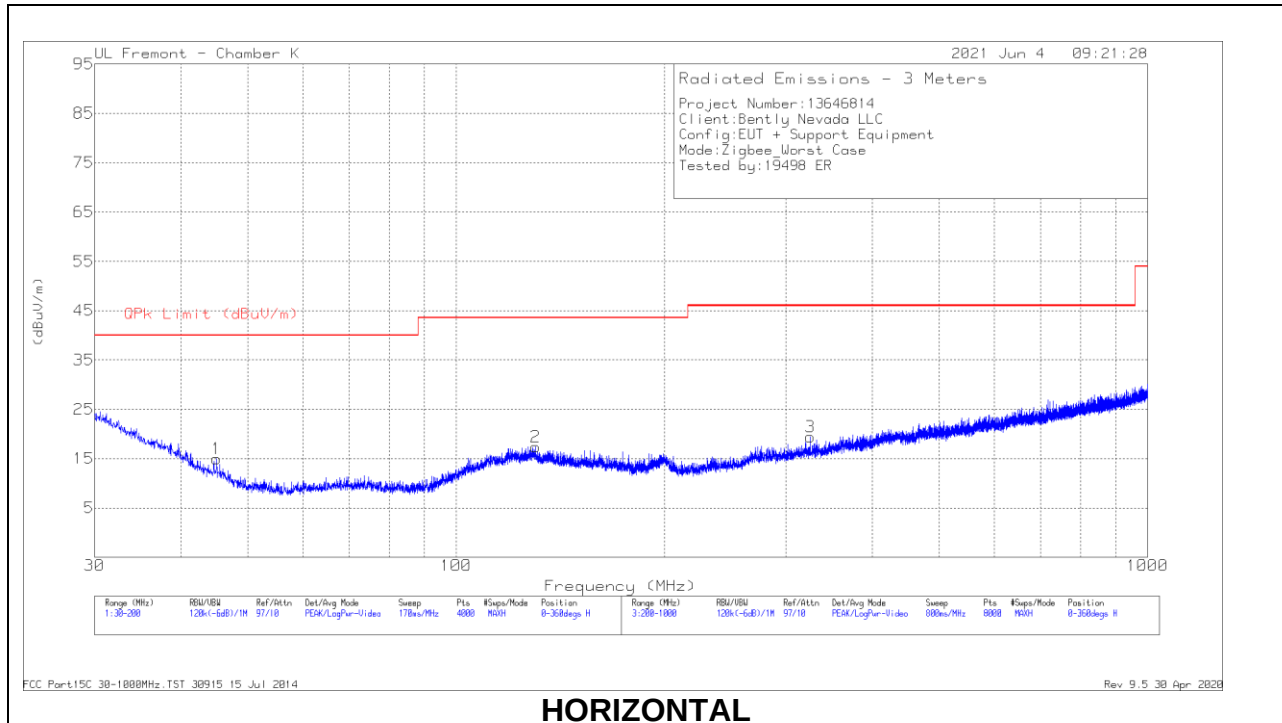
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.86174	33.22	Pk	56.2	-32.2	-40	17.22	28.91	-11.69	0-360
6	.86238	32.88	Pk	56.2	-32.2	-40	16.88	28.9	-12.02	0-360
7	1.16786	19.4	Pk	45.8	-32.1	-40	-6.9	26.28	-33.18	0-360
8	1.75426	15.61	Pk	42.8	-32.1	-40	-13.69	29.5	-43.19	0-360
9	1.1694	17.93	Pk	45.8	-32.1	-40	-8.37	26.27	-34.64	0-360
10	1.73539	16.67	Pk	42.9	-32.1	-40	-12.53	29.5	-42.03	0-360

Pk - Peak detector

10.4. WORST CASE BELOW 1 GHz

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



Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF 81560 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.0489	29.43	Pk	16.9	-31.4	14.93	40	-25.07	0-360	99	H
	45.6433	21.9	Qp	16.5	-31.4	7	40	-33	313	311	H
2	* 130.326	28.15	Pk	19.9	-30.7	17.35	43.52	-26.17	0-360	99	H
4	67.7498	29.89	Pk	14.2	-31.2	12.89	40	-27.11	0-360	95	V
5	146.9903	28.5	Pk	18.8	-30.6	16.7	43.52	-26.82	0-360	95	V
3	* 325.4163	28.78	Pk	20.4	-29.8	19.38	46.02	-26.64	0-360	99	H
6	* 260.7079	28.75	Pk	18.6	-30	17.35	46.02	-28.67	0-360	199	V

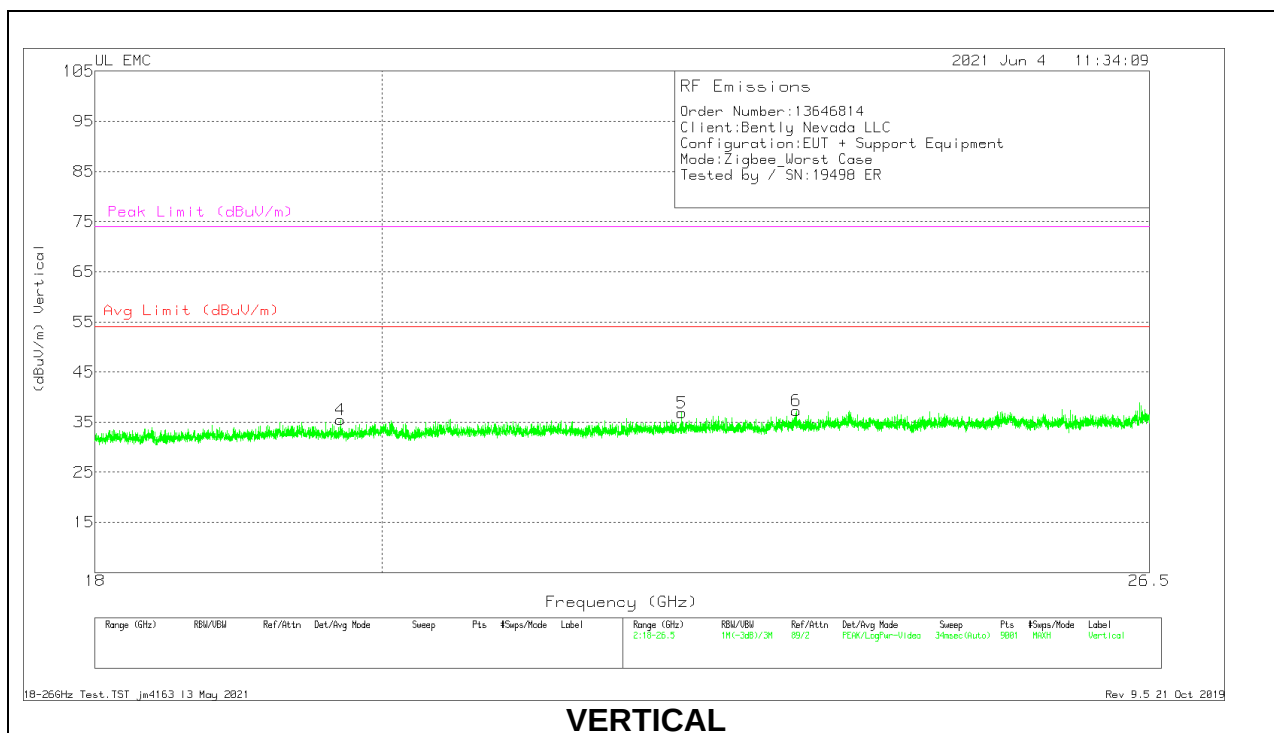
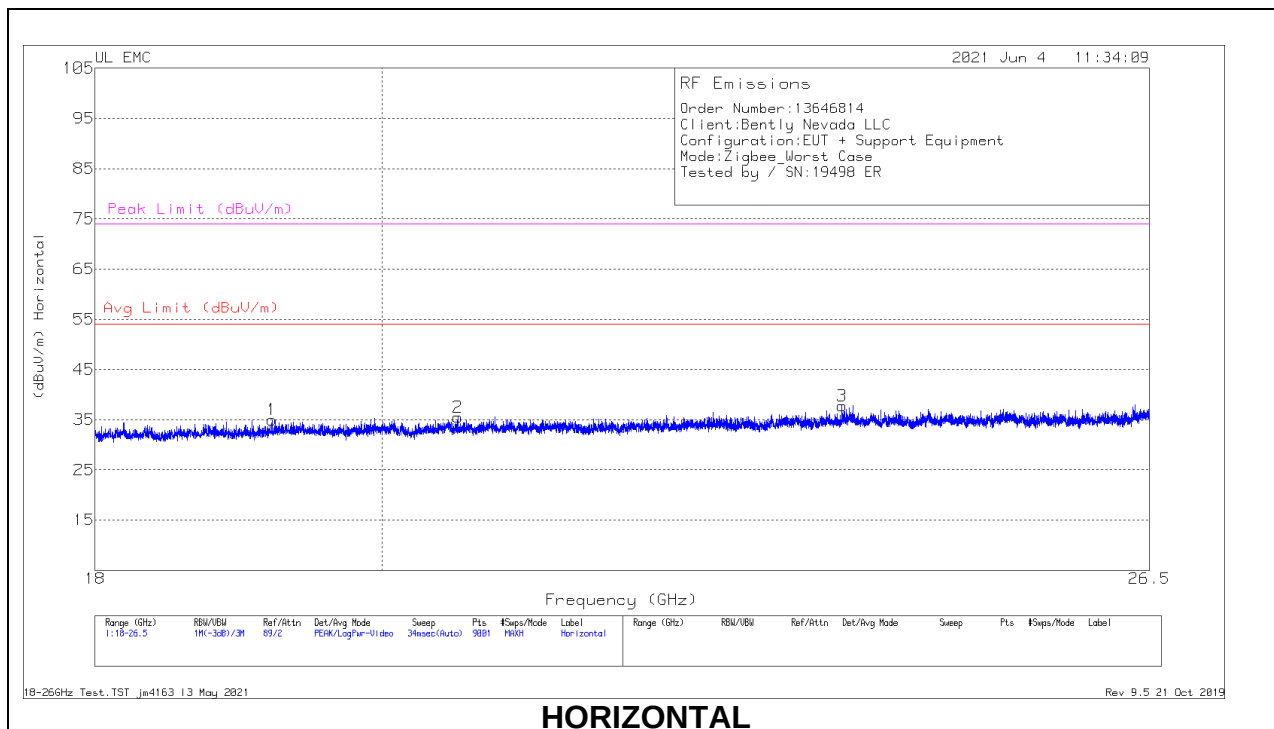
* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

10.5. WORST CASE 18-26 GHz

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

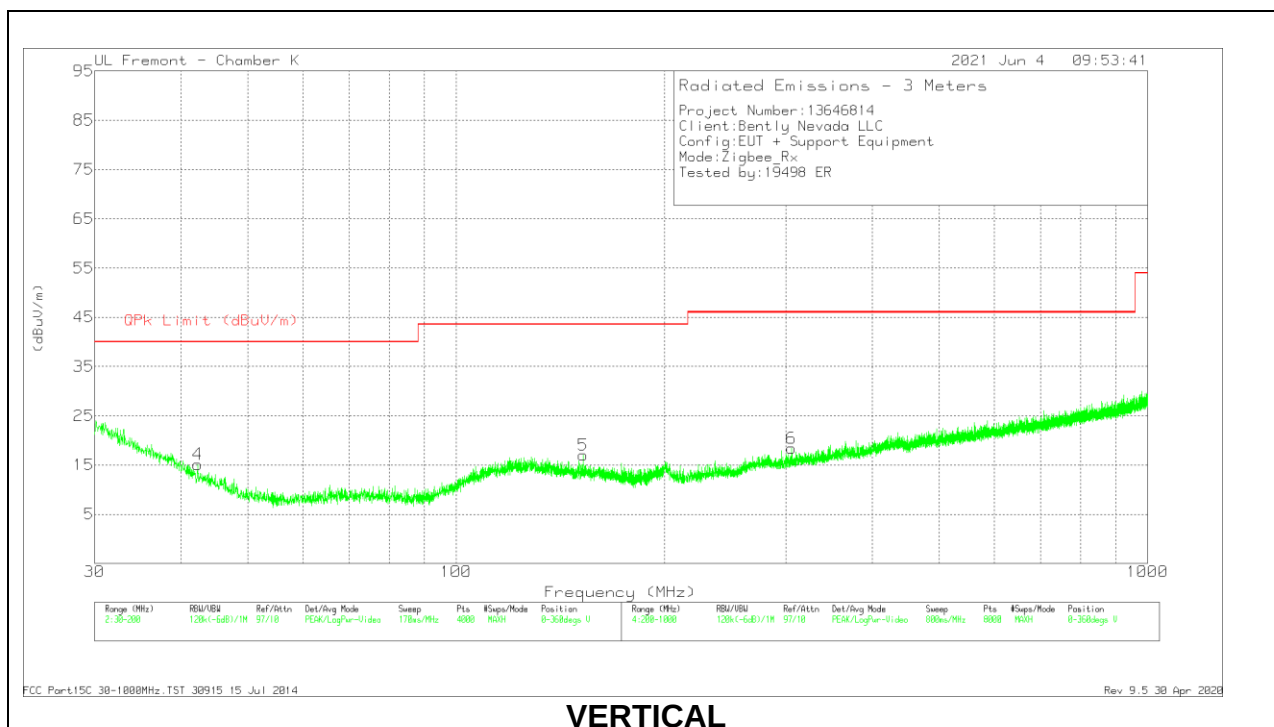
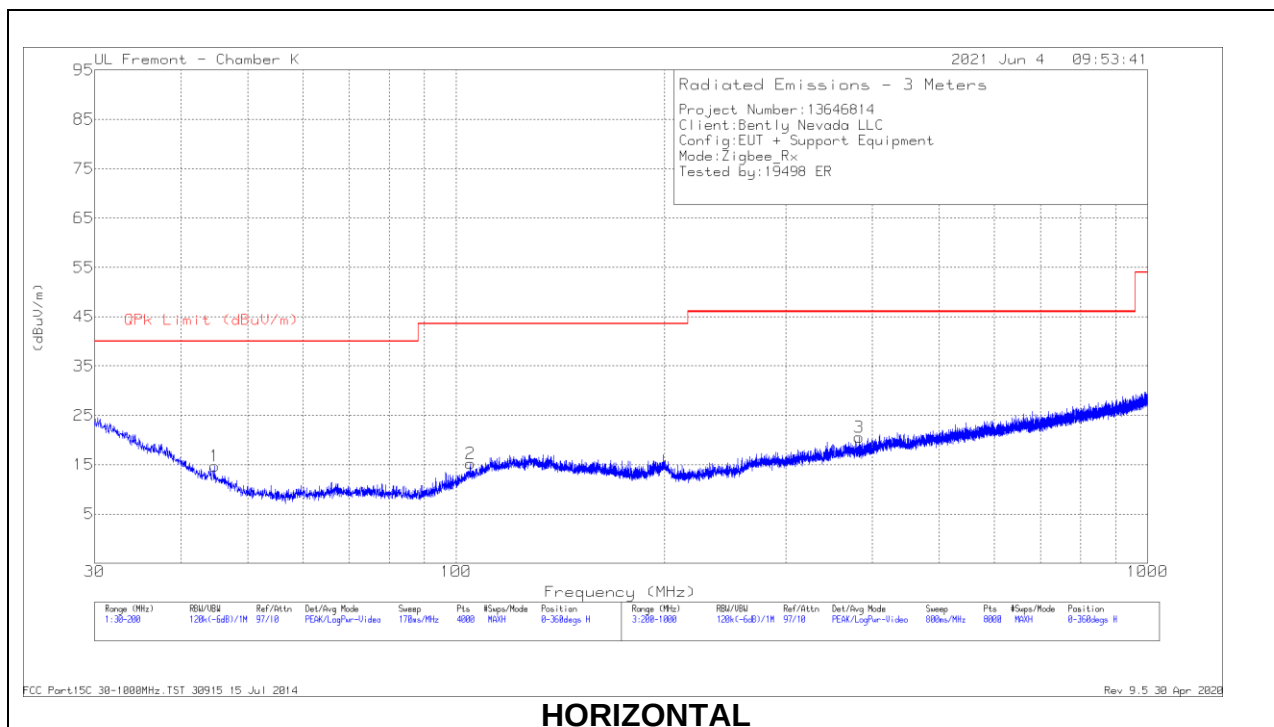


18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cb l (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.207	69.07	Pk	32.7	-57.3	-9.5	34.97	54	-19.03	74	-39.03
2	20.56417	69.3	Pk	33.1	-57.4	-9.5	35.5	54	-18.5	74	-38.5
3	23.67233	69.96	Pk	34.2	-56.9	-9.5	37.76	54	-16.24	74	-36.24
4	19.69528	68.68	Pk	32.8	-56.5	-9.5	35.48	54	-18.52	74	-38.52
5	22.32178	70.57	Pk	33.6	-57.8	-9.5	36.87	54	-17.13	74	-37.13
6	23.28039	69.99	Pk	33.9	-57.1	-9.5	37.29	54	-16.71	74	-36.71

Pk - Peak detector

10.6. RECEIVER WORST-CASE BELOW 1GHz



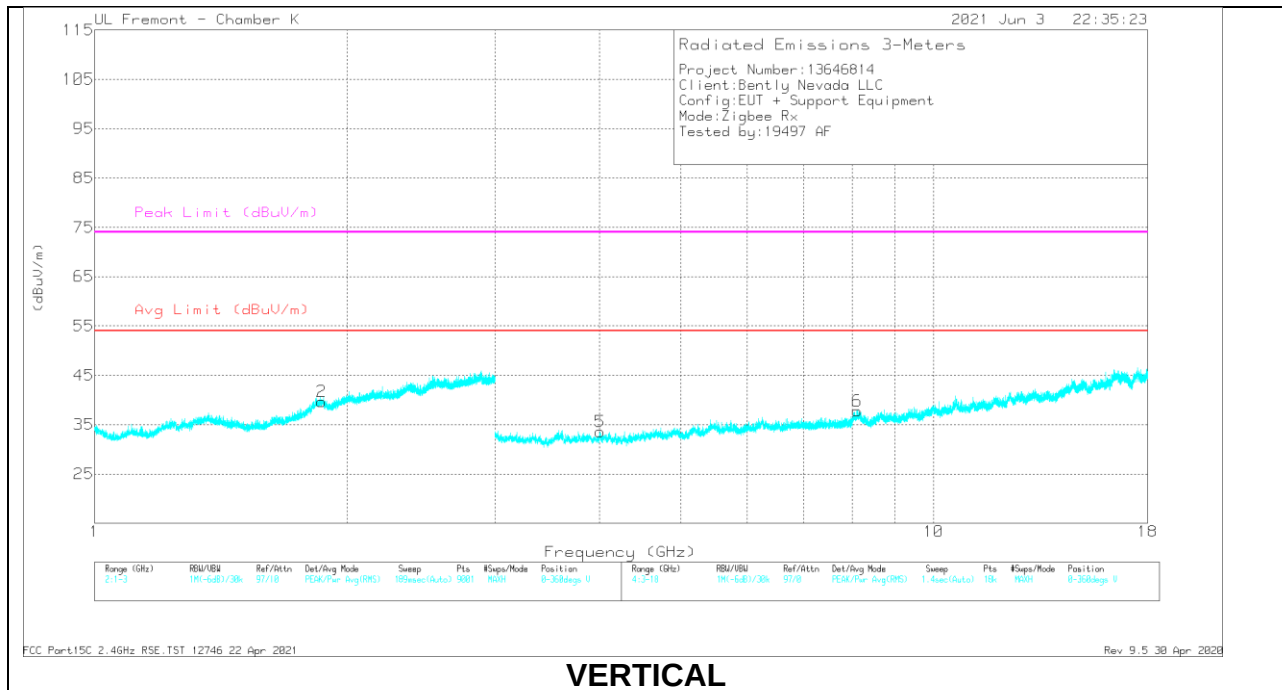
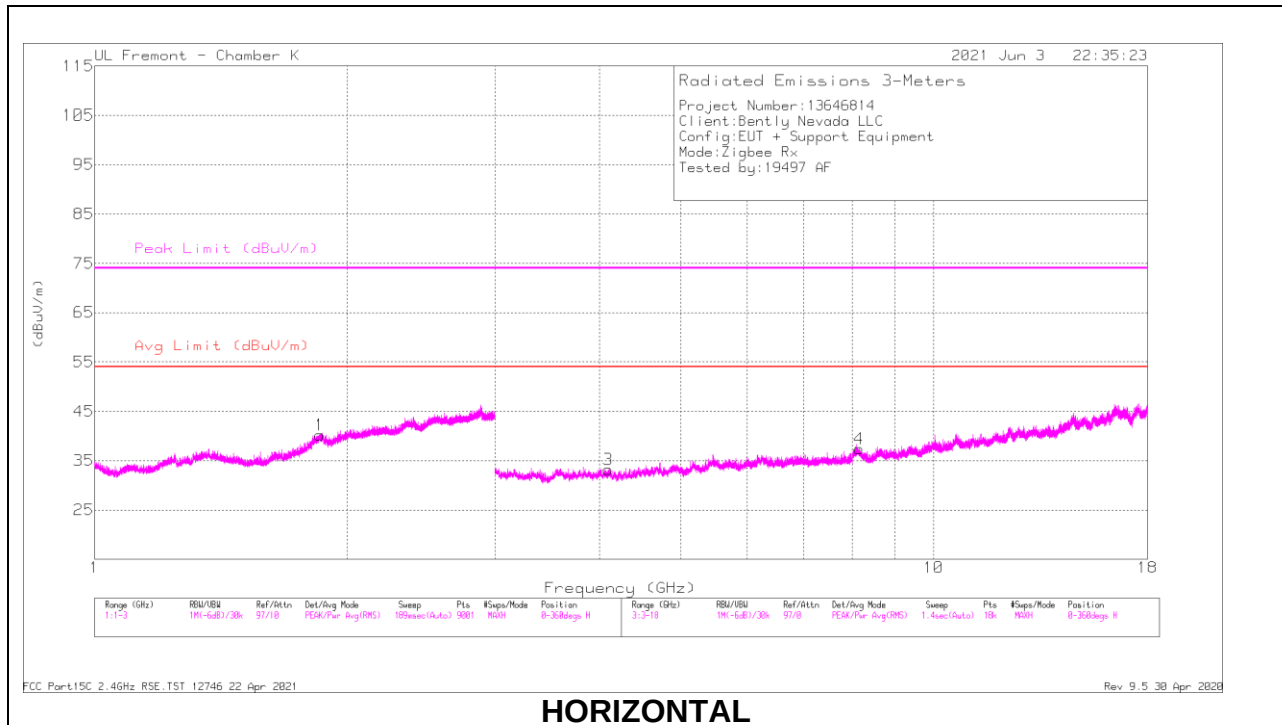
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF 81560 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degr)	Height (cm)	Polarity
1	44.7938	29.13	Pk	17	-31.4	14.73	40	-25.27	0-360	98	H
2	104.8619	28.54	Pk	17.6	-30.9	15.24	43.52	-28.28	0-360	399	H
4	42.3282	27.97	Pk	18.6	-31.4	15.17	40	-24.83	0-360	95	V
	41.6239	20.93	Qp	19.1	-31.4	8.63	40	-31.37	213	178	V
5	152.7718	28.96	Pk	18.6	-30.6	16.96	43.52	-26.56	0-360	95	V
3	383.0238	28.53	Pk	21.5	-29.5	20.53	46.02	-25.49	0-360	299	H
6	305.8138	28.27	Pk	20	-29.8	18.47	46.02	-27.55	0-360	199	V

Pk - Peak detector

Qp - Quasi-Peak detector

10.7. RECEIVER WORST CASE 1-18 GHz



Radiated Emissions

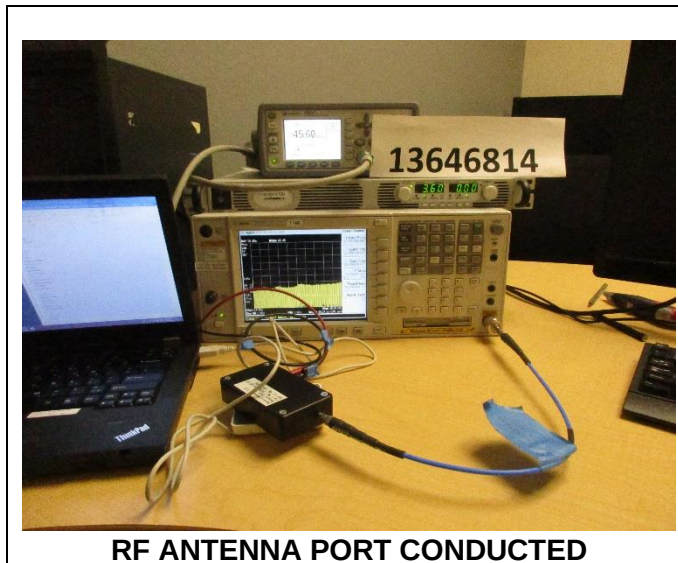
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.85558	32.87	Pk	30.9	-12.1	51.67	-	-	74	-22.33	192	119	H
	1.85558	10.49	Av	30.9	-12.1	29.29	54	-24.71	-	-	192	119	H
2	1.86369	31.62	Pk	30.8	-12.1	50.32	-	-	74	-23.68	177	176	V
	1.86169	10.44	Av	30.8	-12.1	29.14	54	-24.86	-	-	177	176	V
3	4.09605	48.37	Pk	33.6	-41.1	40.87	-	-	74	-33.13	96	128	H
	4.09553	37.15	Av	33.6	-41.1	29.65	54	-24.35	-	-	96	128	H
4	8.15059	49.76	Pk	36	-36.9	48.86	-	-	74	-25.14	270	336	H
	8.15059	35.69	Av	36	-36.9	34.79	54	-19.21	-	-	270	336	H
5	4.00399	52.86	Pk	33.7	-41.1	45.46	-	-	74	-28.54	14	393	V
	4.00399	38.46	Av	33.7	-41.1	31.06	54	-22.94	-	-	14	393	V
6	8.11974	49.33	Pk	36	-36.5	48.83	-	-	74	-25.17	343	296	V
	8.11774	35.64	Av	36	-36.5	35.14	54	-18.86	-	-	343	296	V

Pk - Peak detector

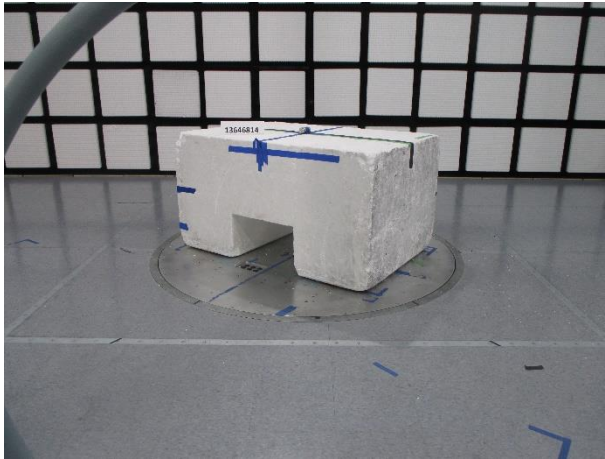
Av - Average detection

11. SETUP PHOTOS

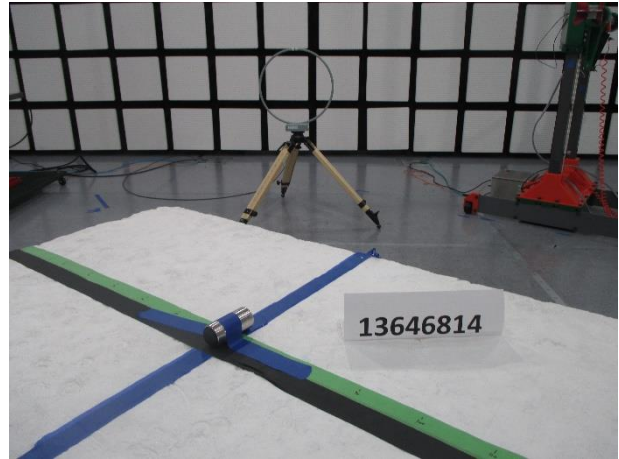
ANTENNA PORT CONDUCTED SETUP



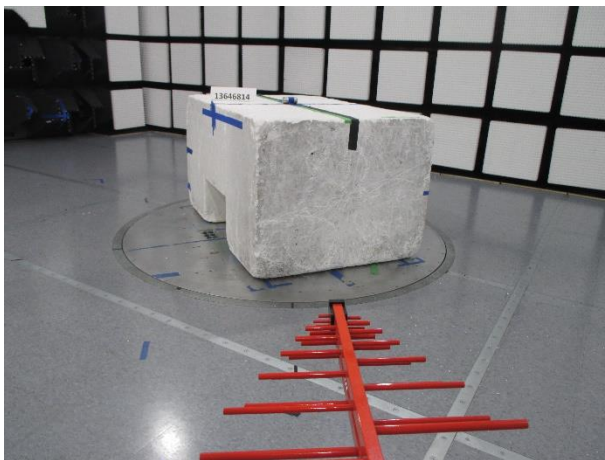
RADIATED RF MEASUREMENT SETUP



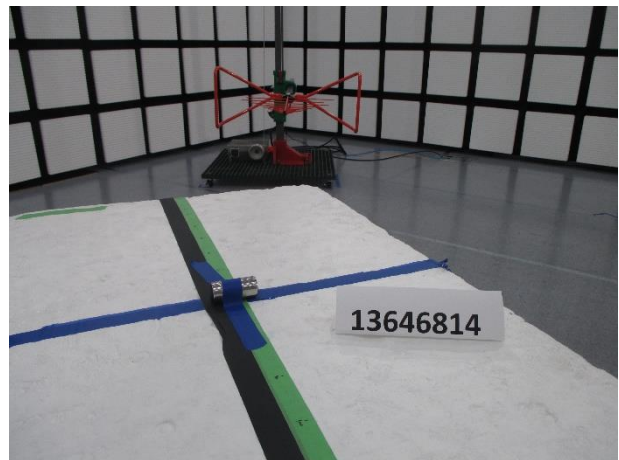
BELOW 30MHz (FRONT)



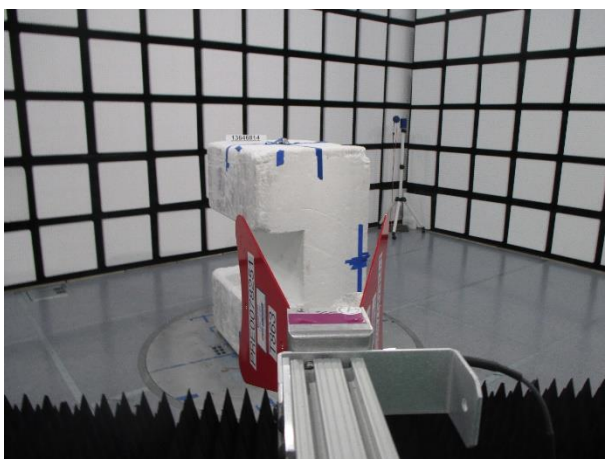
BELOW 30MHz (BACK)



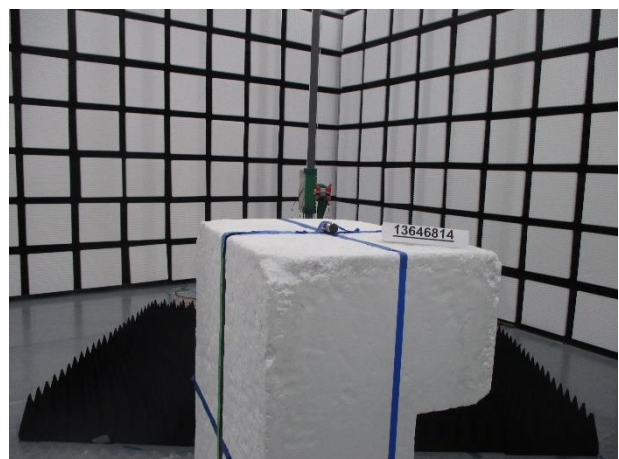
BELOW 1GHz (FRONT)



BELOW 1GHz (BACK)

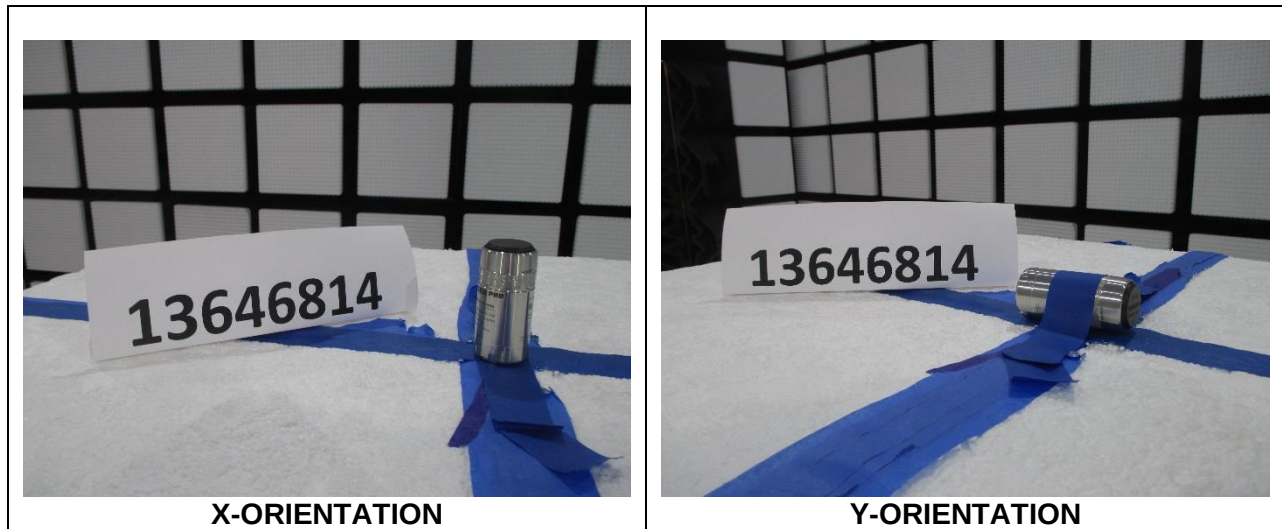


ABOVE 1GHz (FRONT)



ABOVE 1GHz (BACK)

ORIENTATIONS



END OF TEST REPORT