



# **CERTIFICATION TEST REPORT**

**Report Number. :** 4789464428-FR1V2

**Applicant :** SEGI LIMITED  
Unit J2, 4/F, Block 1, Kinho Industrial Building,  
14-24 Au Pui Wan Street, Shatin, New Territories  
HONGKONG, China

**Model :** ANT-2WSF

**FCC ID :** VA5ANH500-2WLF  
**IC :** 7087A-2WANH500LF

**EUT Description :** Keyless Entry System

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-247 Issue 2  
INDUSTRY CANADA RSS-GEN Issue 5

**Date Of Issue:**  
July 15, 2020

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**Testing Laboratory**  
**TL-637**

## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	07/14/20	Initial issue	Robby Lee
V2	07/15/20	Updated about the TCB's question	Robby Lee

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SEGI LIMITED  
**EUT DESCRIPTION:** Keyless Entry System  
**MODEL:** ANT-2WSF  
**SERIAL NUMBER:** Prototype (CONDUCTED)  
Prototype (RADIATED);  
**DATE TESTED:** JUN 17, 2020 – JUL 10, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
INDUSTRY CANADA RSS-247 Issue 2	Complies
INDUSTRY CANADA RSS-GEN Issue 5	Complies

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL Korea, Ltd. By:



CY Choi  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Robby Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. SUMMARY TABLE

FCC Part Section	IC Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass
15.247 (b)(3)	RSS-247 5.4(d)	TX conducted output power	<30dBm		Pass
15.247 (e)	RSS-247 5.2(b)	PSD	<8dBm		Pass
15.207 (a)	RSS-GEN Clause 8.8	AC Power Line conducted emissions	Section 11	Power Line conducted	N/A <sup>note 1</sup>
15.205, 15.209	RSS-GEN Clause 7 & 8.9	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	Pass

Note 1 : The EUT is only supplied by vehicular battery.

### 3. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. IC RSS-247 Issue 2
4. IC RSS-GEN Issue 5
5. KDB 558074 D01 15.247 Meas Guidance v05r02.
6. ANSI C63.10-2013.

### 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. 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.

218 Maeyeong-ro
<input type="checkbox"/> Chamber 1
<input type="checkbox"/> Chamber 2
<input checked="" type="checkbox"/> Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/wp-content/uploads/2017/05/TL-637.pdf>.

## 5. CALIBRATION AND UNCERTAINTY

### 5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 5.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

### 5.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is Keyless Entry System.  
This test report addresses the DTS operational mode.

### 6.2. MAXIMUM OUTPUT POWER

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

Frequency Range[MHz]	Modulation Type	Power Mode	Output Power [dBm]	Output Power [mW]
907 ~ 919	DSSS	Peak	18.84	76.56

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

**The internal antenna was Permanently attached.  
Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antenna, with a maximum gain of -0.2 dBi

### 6.4. WORST-CASE CONFIGURATION AND MODE

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

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

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



## 6.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID/DoC
Test Jig	SEGI	N/A	N/A	N/A

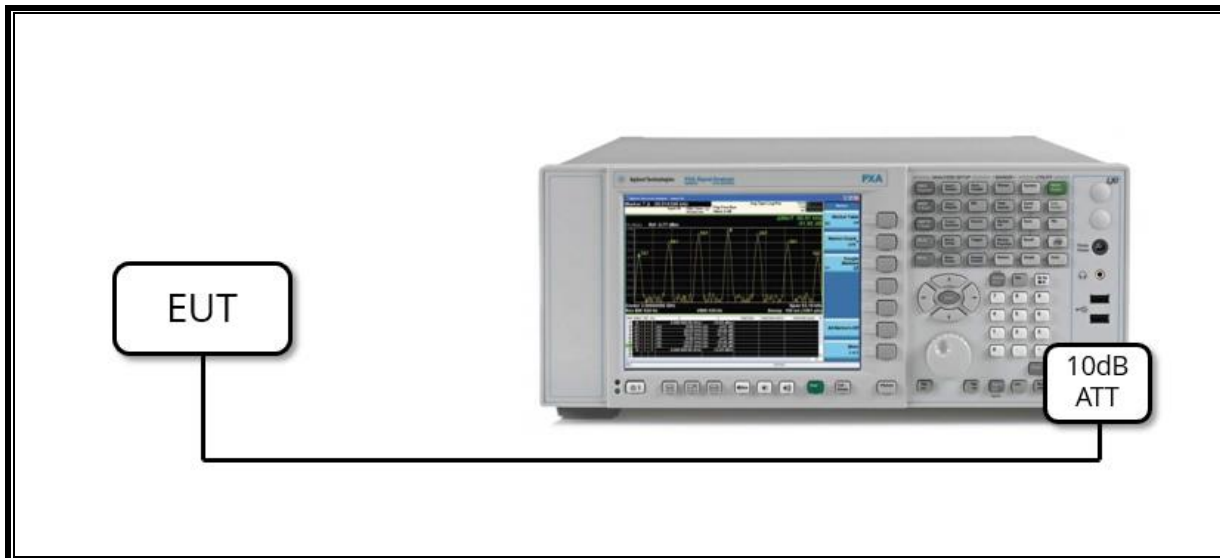
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length(m)	Remarks
1	DC & DATA	1	Pin	Unshielded	1.0m	From EUT to Jig

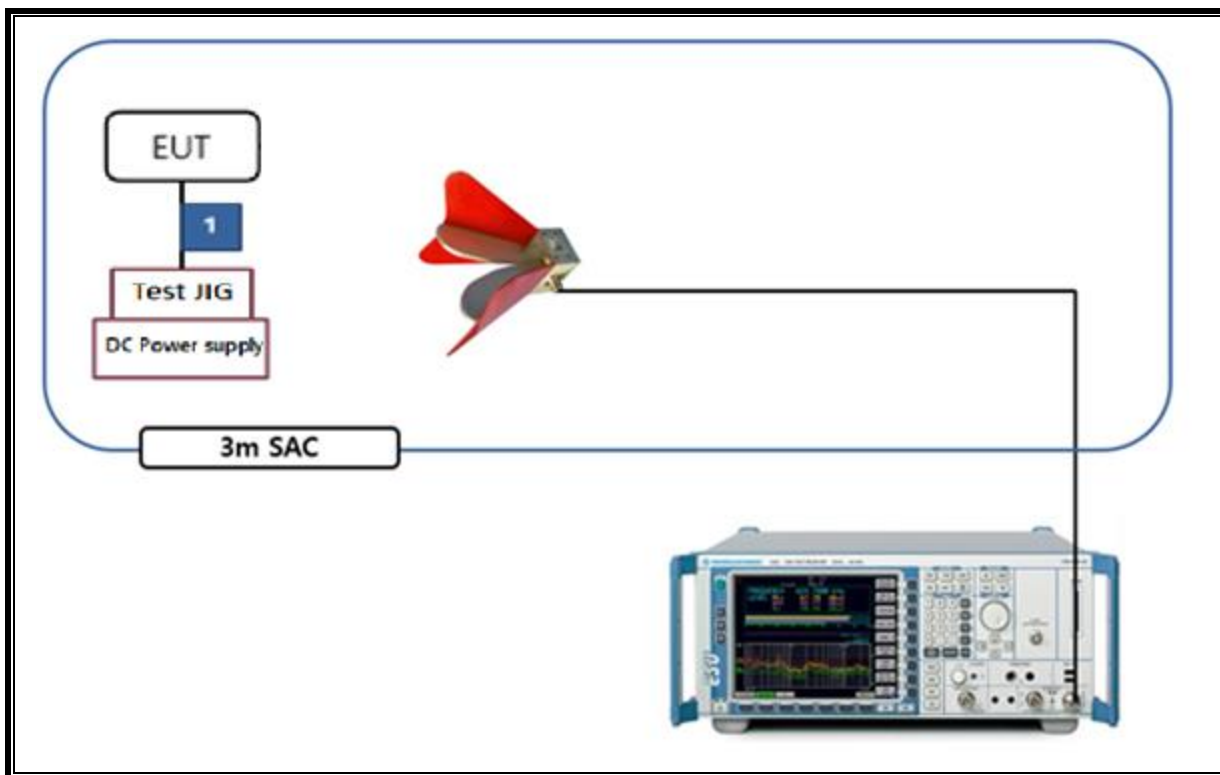
### TEST SETUP

The EUT was tested in forced transmit mode using test jig.

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 7. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.1.1

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band Emissions (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Non-restricted Bands: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Restricted Bands : KDB 558074 D01 v05r02, Section 8.6.

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

## 8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	S/N	Next Cal. Date
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	08-04-20
Preamplifier	ETS	3116C-PA	00168841	08-08-20
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-05-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20
Attenuator	PASTERNAK	PE7087-10	A009	08-08-20
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-05-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-06-20
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Antenna, Loop, 9kHz-30MHz				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	

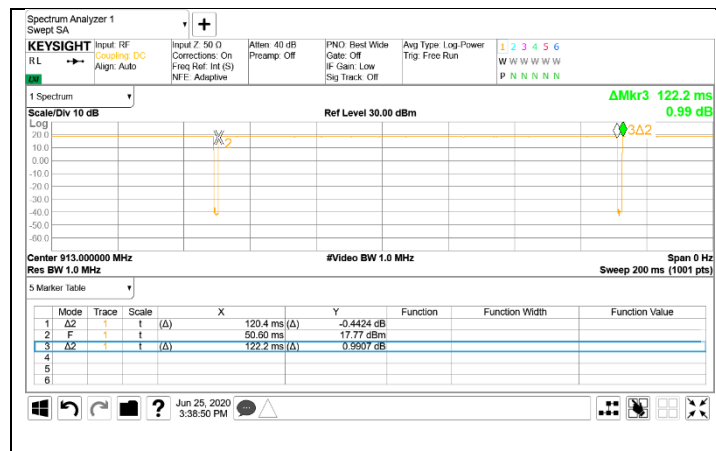
## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
DSSS	120.4	122.2	0.985	98.5%	0.00	0.010



## **9.2. 99% BANDWIDTH**

### **LIMITS**

None; for reporting purposes only.

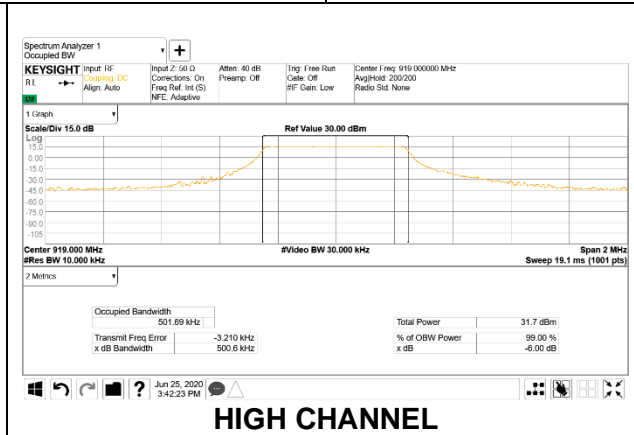
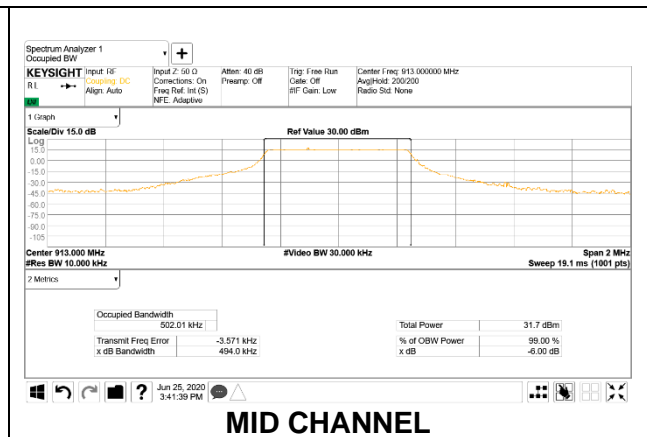
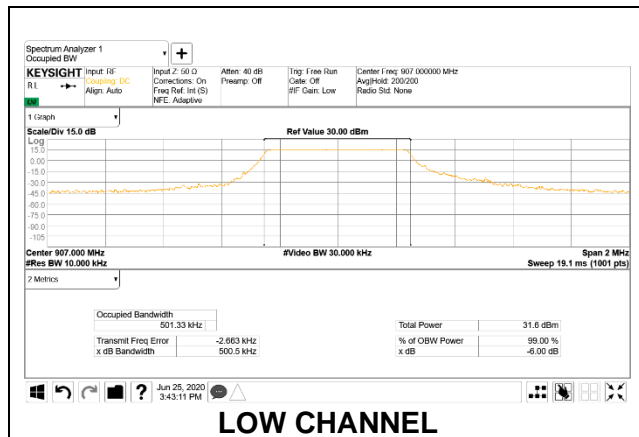
### **TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to  $\geq 3$  times the RBW. The spectrum analyzer internal 99% bandwidth function is utilized.

### **RESULTS**

**99% BANDWIDTH data**

Channel	Frequency [MHz]	99% Bandwidth [kHz]
Low	907	501.33
Mid	913	<b>502.01</b>
High	919	501.69
Worst		502.01



### **9.3. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

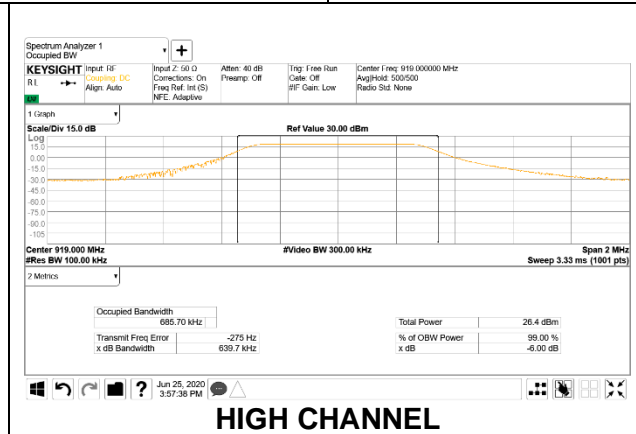
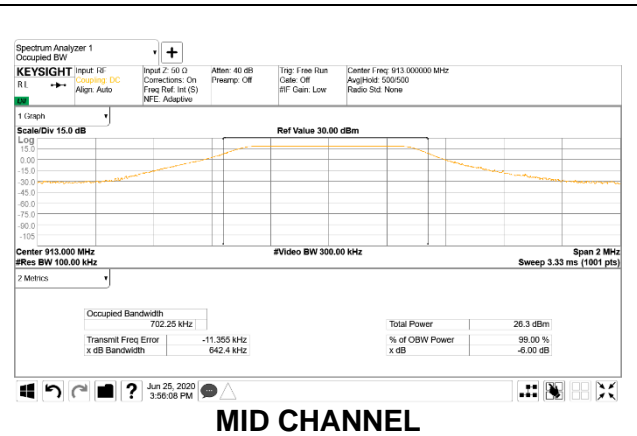
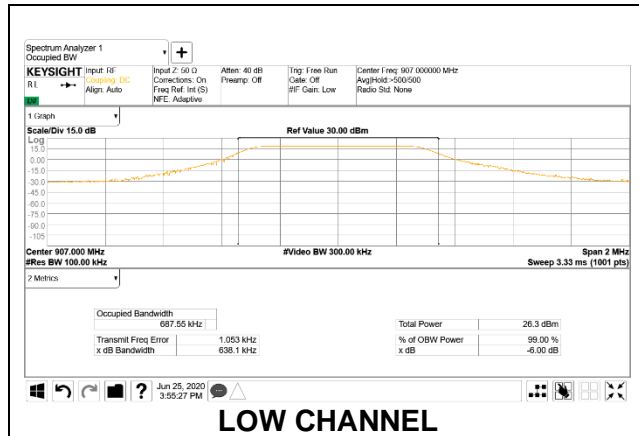
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **RESULTS**



**6dB Bandwidth data**

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minumun Limit [kHz]
Low	907	638.1	500.0
Mid	913	<b>642.4</b>	500.0
High	919	639.7	500.0
Worst		642.4	500.0



## 9.4. OUTPUT POWER

### LIMITS

FCC §15.247 (b)

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

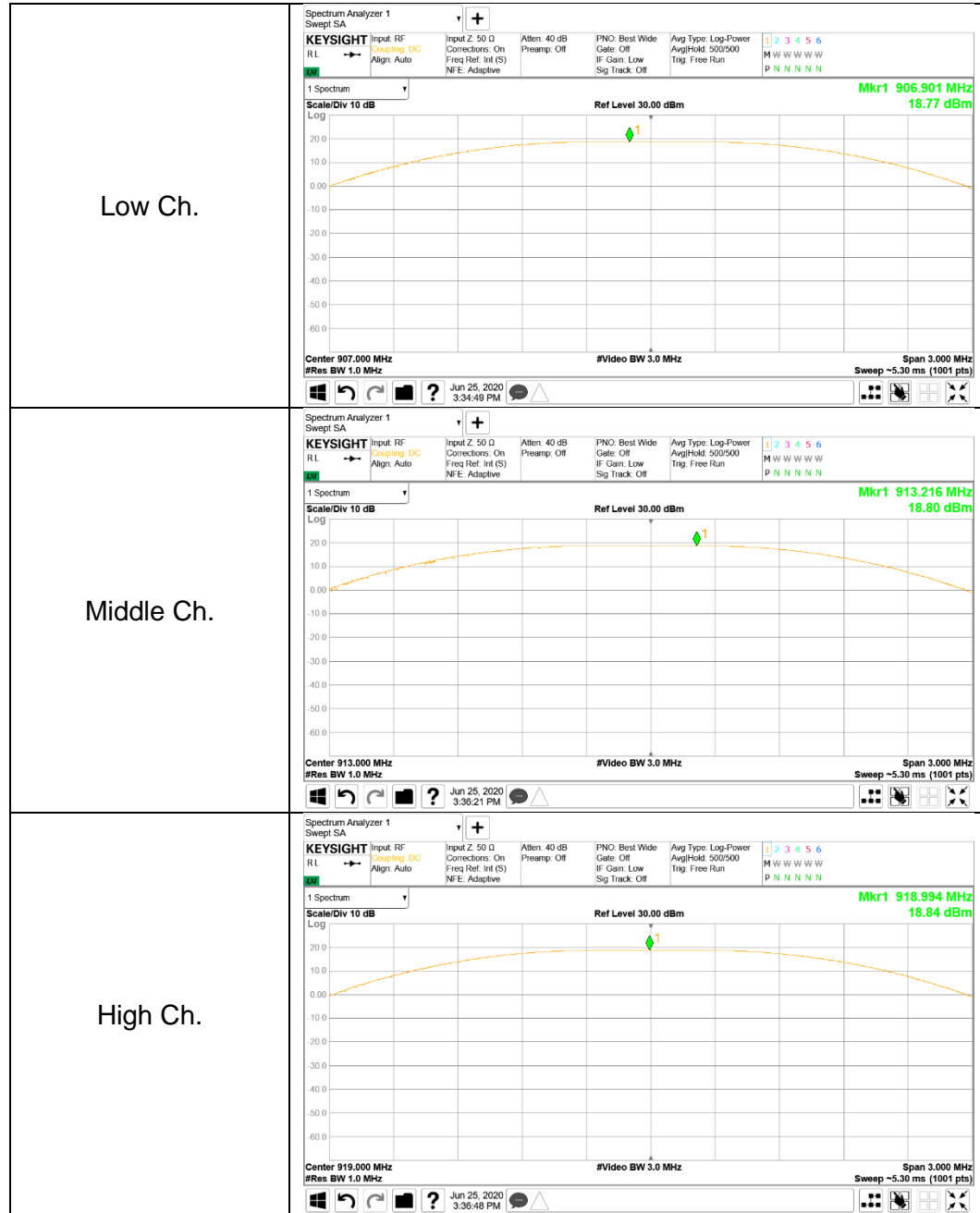
### TEST PROCEDURE

Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer.

### RESULTS

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	907	18.77	30.000	-11.23
Mid	913	18.80	30.000	-11.20
High	919	<b>18.84</b>	30.000	-11.16
Worst		18.84	30.000	-11.16

**PEAK OUTPUT POWER PLOTS**



## **9.5. POWER SPECTRAL DENSITY**

### **LIMITS**

FCC §15.247 (e)

RSS-247 (5.2) (b)

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

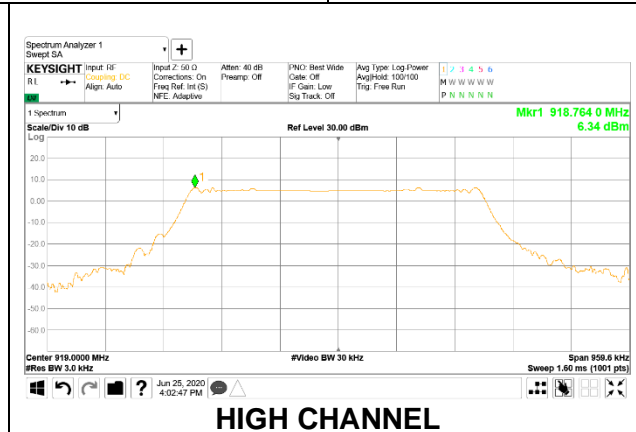
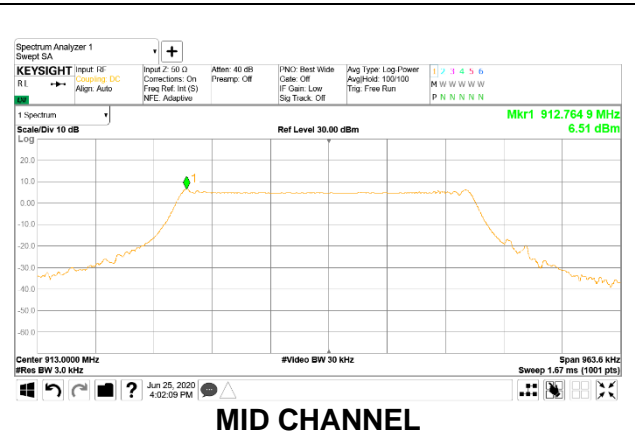
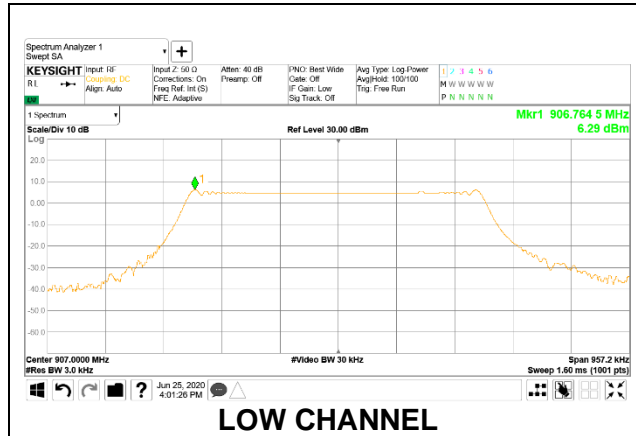
### **TEST PROCEDURE**

Power Spectral Density was measured using ANSI C63.10(2013) under section 11.10.2 utilizing spectrum analyzer.

### **RESULTS**

**PSD data**

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	907	6.29	8.00	-1.71
Mid	913	<b>6.51</b>	8.00	-1.49
High	919	6.34	8.00	-1.66



## 9.6. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d)

RSS-247 5.5

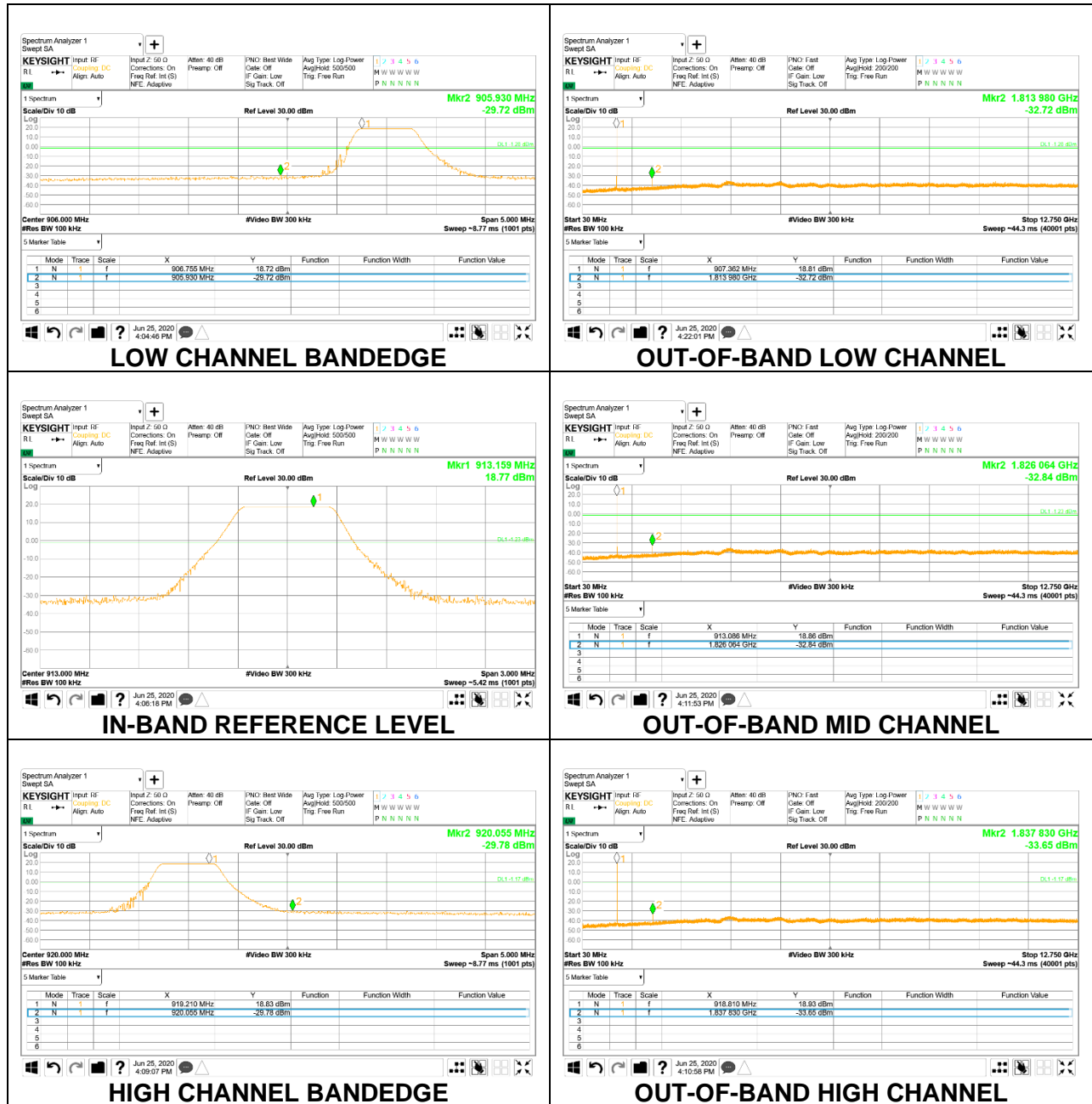
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

### RESULTS

**Test data**



## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.



IC RSS-GEN Sections 8.9 and 8.10.

Frequency (MHz)	Field strength ( $\mu\text{V}/\text{m}$ at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Frequency (MHz)	Magnetic field strength (H-Field) ( $\mu\text{A}/\text{m}$ )	Measurement Distance (m)
0.009–0.490 <sup>Note 1</sup>	6.37/F (F in kHz)	300
0.490–1.705	63.7/F (F in kHz)	30
1.705–30.0	0.08	30
Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.		

Note: The limits for spurious emissions below 30 MHz in RSS GEN Section 8.9 Table 6 are given in dBuA/m while the FCC Part 15.209(a) limits are expressed in dBuV/m. Using the free space impedance of  $377\Omega$  to convert between electric and magnetic field strength (a factor of 51.5dB in logarithmic units) the two sets of limits are equivalent and therefore a measured value of X dBuV/m shown in the plots and tables is equal to a magnetic field strength of (X - 51.5) dBuA/m and the margin of that emission relative to the RSS GEN limit (FCC 15.209 limit – 51.5) dBuA/m would be the same as the margin to the FCC limit detailed in those plots/tables.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for 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. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted band-edge, Final detection of spurious harmonic emissions) Duty cycle factor =  $10 \log(1/x)$ . But this EUT operated on a duty cycle of over 98% during test. Therefore, duty cycle factor is not applied.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1 GHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the band (902 MHz ~ 928 MHz).  
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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.

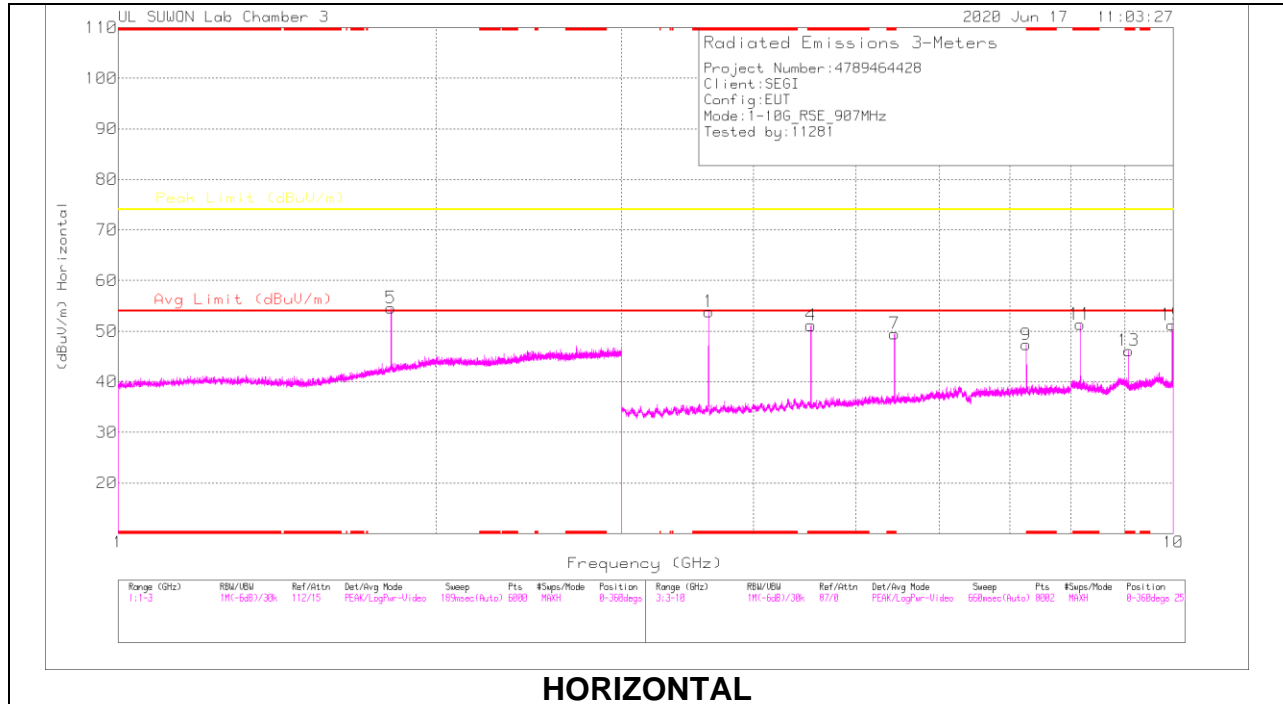
Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).  
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

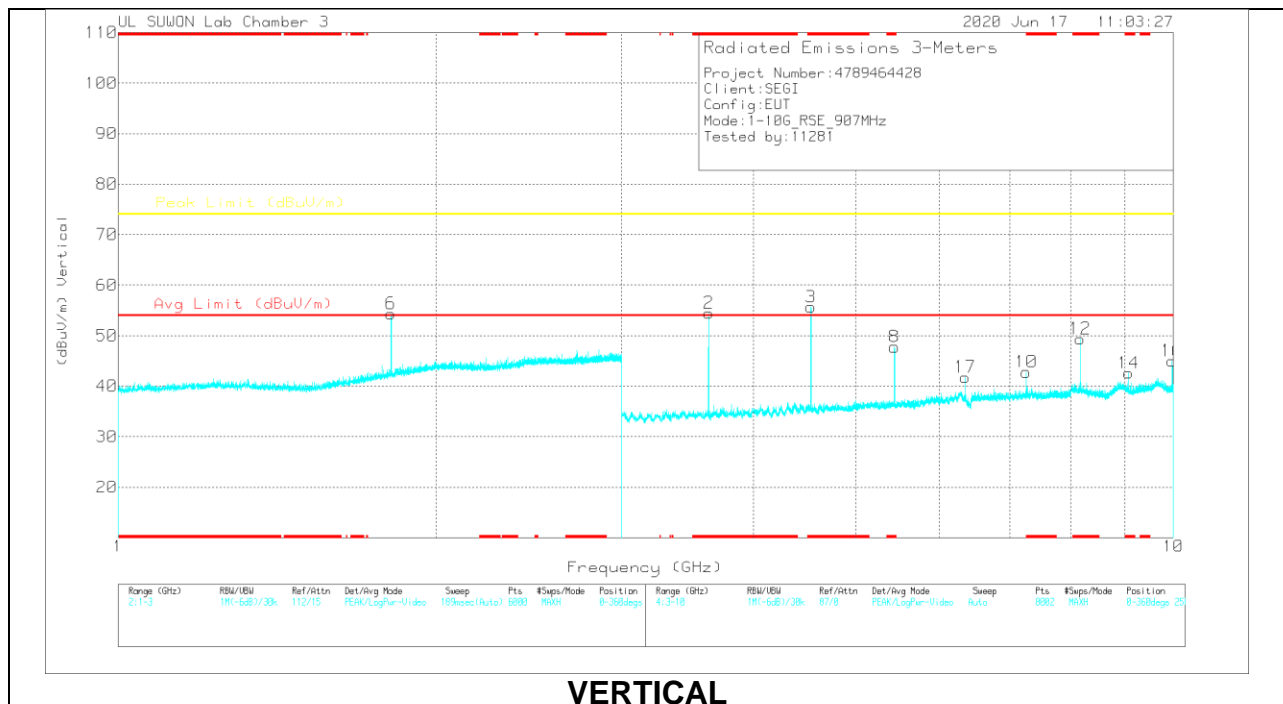
## 10.2. TRANSMITTER ABOVE 1 GHz

### HARMONICS AND SPURIOUS EMISSIONS

#### LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

**RADIATED EMISSIONS**

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.8141	52.09	PK2	30.5	-22.9	59.69	-	-	74	-14.31	288	100	H
1.81389	46.42	MAv1	30.5	-22.9	54.02	-	-	-	-	288	100	H
1.81378	50.75	PK2	30.5	-22.9	58.35	-	-	74	-15.65	190	151	V
1.81389	44.53	MAv1	30.5	-22.9	52.13	-	-	-	-	190	151	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

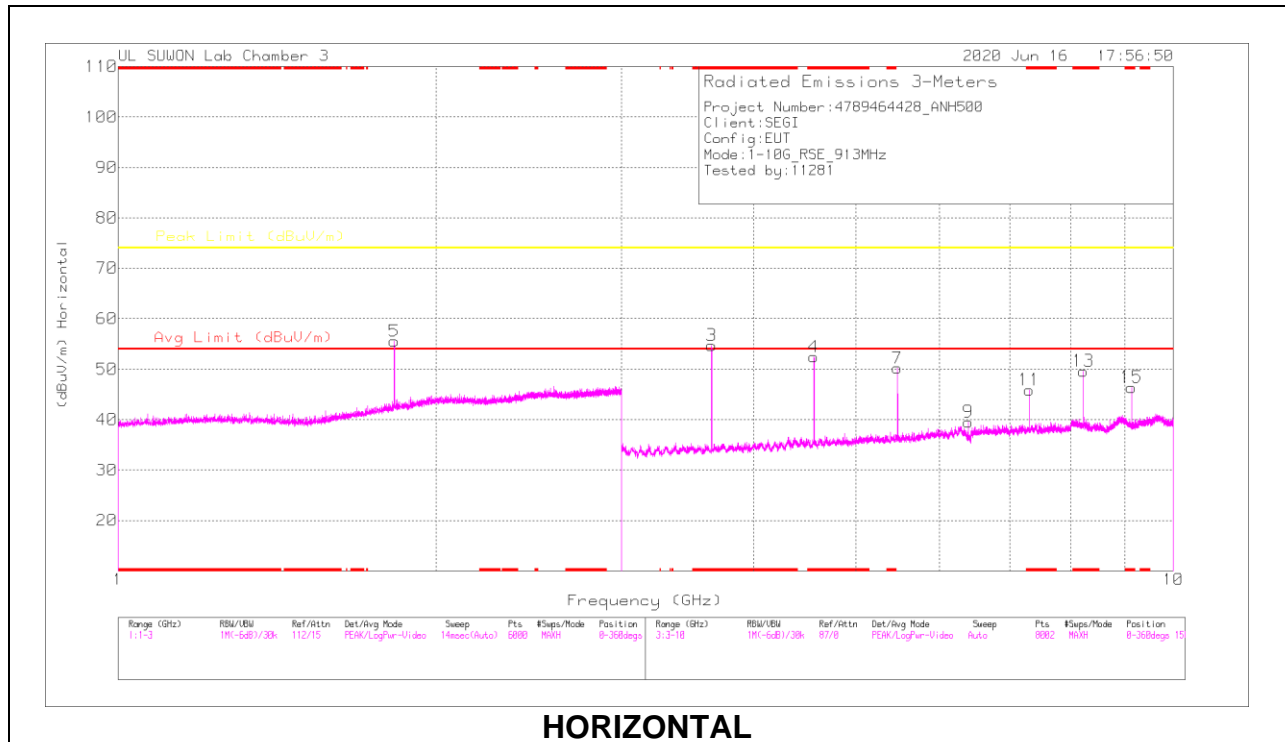
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.62791	47.77	MAv1	33	-29.9	50.87	54	-3.13	-	-	300	186	H
* 4.53575	42.24	MAv1	33.8	-28.5	47.54	54	-6.46	-	-	61	102	H
* 5.44155	36.42	MAv1	34.3	-25.6	45.12	54	-8.88	-	-	194	100	H
* 7.257	29.86	MAv1	35.6	-22.8	42.66	54	-11.34	-	-	202	106	H
* 8.16327	29.8	MAv1	35.8	-20.8	44.8	54	-9.2	-	-	142	113	H
* 9.06957	24.68	MAv1	36.3	-19.9	41.08	54	-12.92	-	-	192	103	H
* 3.62791	47.64	MAv1	33	-29.9	50.74	54	-3.26	-	-	298	206	V
* 4.53447	45.92	MAv1	33.8	-28.5	51.22	54	-2.78	-	-	0	300	V
* 5.44288	34.36	MAv1	34.3	-25.6	43.06	54	-10.94	-	-	338	120	V
* 7.2574	26.34	MAv1	35.6	-22.9	39.04	54	-14.96	-	-	218	100	V
* 8.16296	28.97	MAv1	35.8	-20.8	43.97	54	-10.03	-	-	153	271	V
* 9.07126	23.41	MAv1	36.3	-19.9	39.81	54	-14.19	-	-	180	235	V
* 3.62859	54.02	PK2	33	-29.9	57.12	-	-	74	-16.88	300	186	H
* 4.53547	51.94	PK2	33.8	-28.5	57.24	-	-	74	-16.76	61	102	H
* 5.44263	45.27	PK2	34.3	-25.6	53.97	-	-	74	-20.03	194	100	H
* 7.2555	40.5	PK2	35.6	-22.9	53.2	-	-	74	-20.8	202	106	H
* 8.16397	39.98	PK2	35.8	-20.8	54.98	-	-	74	-19.02	142	113	H
* 9.06894	36.13	PK2	36.3	-19.9	52.53	-	-	74	-21.47	192	103	H
9.97485	36.73	PK2	37.1	-18.6	55.23	-	-	74	-18.77	174	101	H
* 3.62777	53.26	PK2	33	-29.9	56.36	-	-	74	-17.64	298	206	V
* 4.53492	55.95	PK2	33.8	-28.5	61.25	-	-	74	-12.75	0	300	V
* 5.44073	43.65	PK2	34.3	-25.6	52.35	-	-	74	-21.65	338	120	V
* 7.25422	37.94	PK2	35.6	-22.9	50.64	-	-	74	-23.36	218	100	V
* 8.16159	39.7	PK2	35.8	-20.8	54.7	-	-	74	-19.3	153	271	V
* 9.07058	34.65	PK2	36.3	-19.9	51.05	-	-	74	-22.95	180	235	V
9.9782	33.01	PK2	37.1	-18.6	51.51	-	-	74	-22.49	170	147	V
6.3491	39.57	PK2	35.4	-25	49.97	-	-	74	-24.03	226	103	V

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

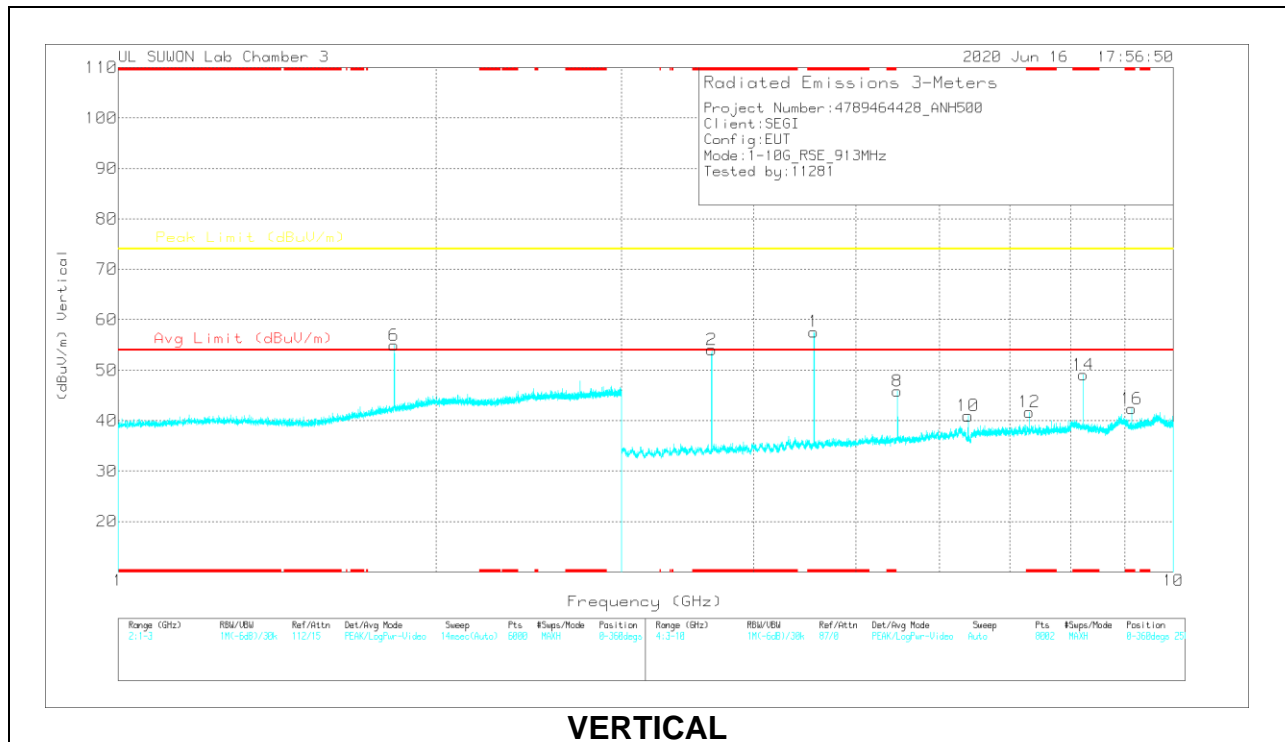
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### MID CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.82624	52.25	PK2	30.6	-22.8	60.05	-	-	74	-13.95	333	100	H
1.82601	46.65	MAv1	30.6	-22.8	54.45	-	-	-	-	333	100	H
1.82641	49.61	PK2	30.6	-22.8	57.41	-	-	74	-16.59	22	121	V
1.82602	42.29	MAv1	30.6	-22.8	50.09	-	-	-	-	22	121	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

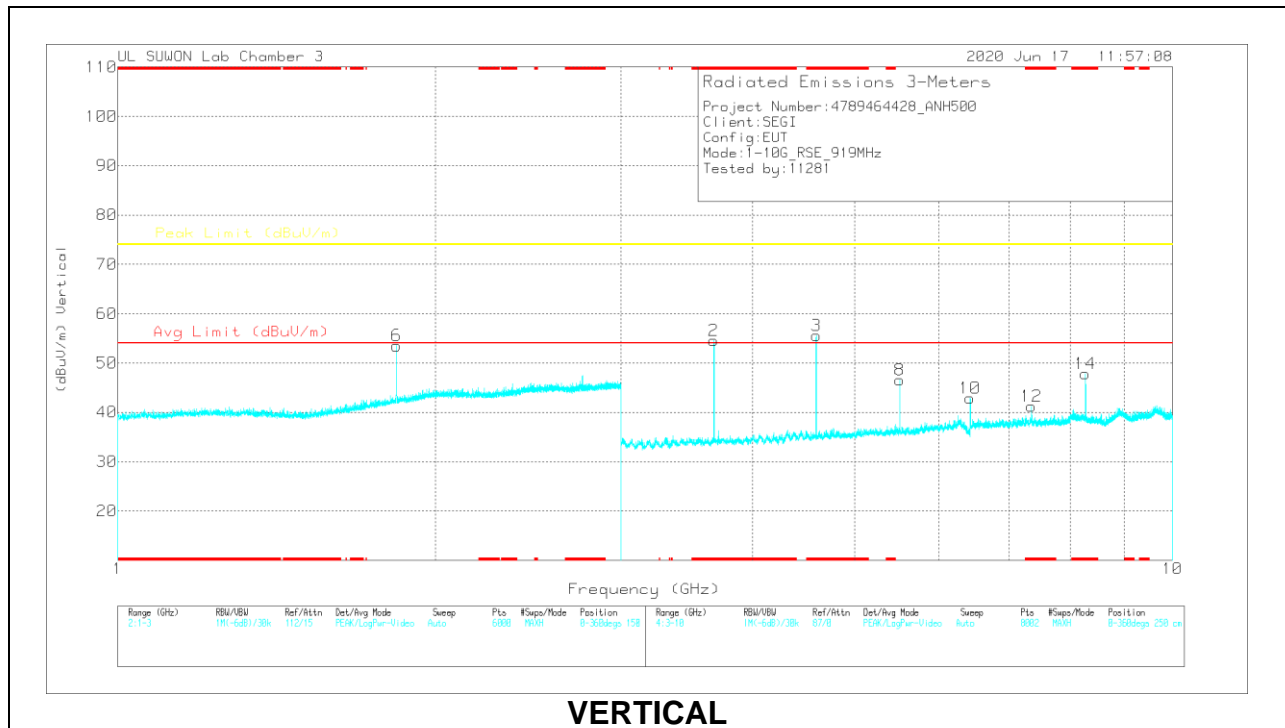
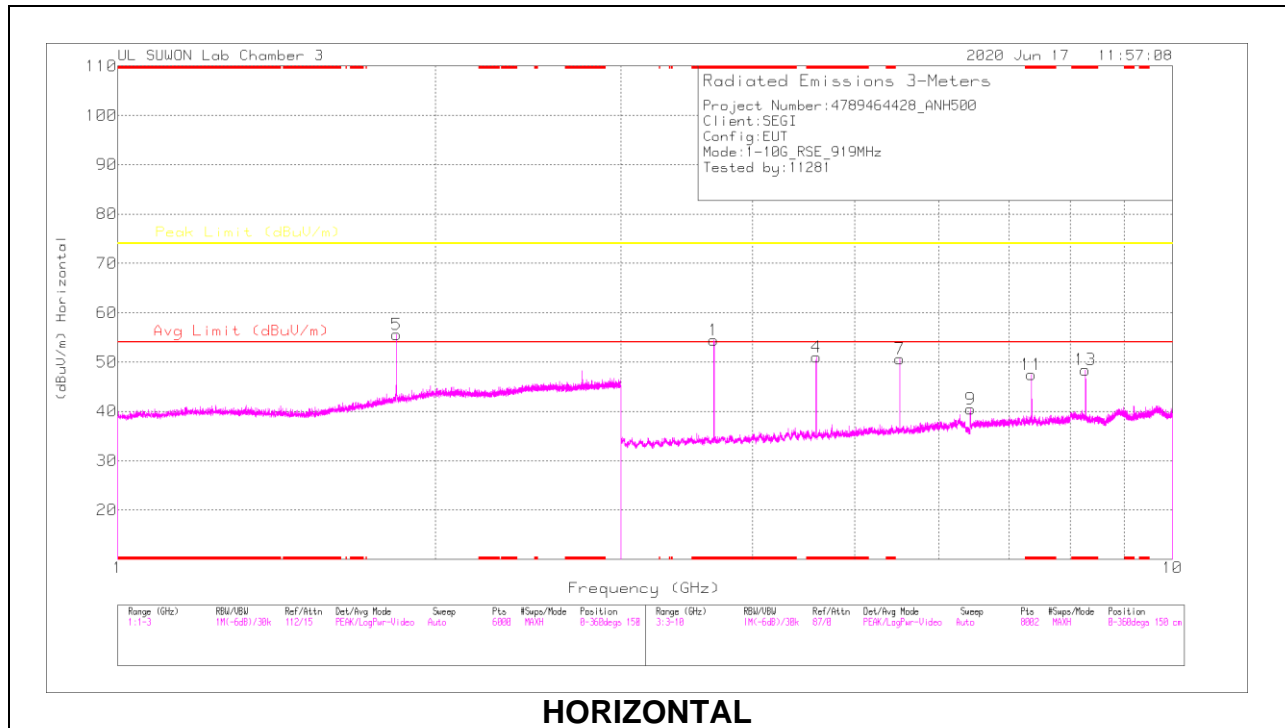
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.65196	47.89	MAv1	33	-29.6	51.29	54	-2.71	-29.6	51.29	249	121	H
* 4.56566	43.46	MAv1	33.8	-28.6	48.66	54	-5.34	-28.6	48.66	54	101	H
* 7.30341	29.08	MAv1	35.6	-22.7	41.98	54	-12.02	-22.7	41.98	201	113	H
* 8.21685	28.51	MAv1	35.8	-21.6	42.71	54	-11.29	-	-	142	115	H
* 9.13098	23.25	MAv1	36.3	-20.4	39.15	54	-14.85	-	-	154	254	H
* 4.56521	47.91	MAv1	33.8	-29.3	52.41	54	-1.59	-	-	0	126	V
* 3.65154	47.04	MAv1	33	-30.3	49.74	54	-4.26	-	-	319	152	V
* 7.30481	25.38	MAv1	35.6	-23.4	37.58	54	-16.42	-	-	316	107	V
* 8.21818	28.9	MAv1	35.8	-21.6	43.1	54	-10.9	-	-	152	284	V
* 9.13181	22.47	MAv1	36.3	-20.4	38.37	54	-15.63	-	-	186	257	V
* 3.65256	53.5	PK2	33	-30.3	56.2	-	-	74	-17.8	249	121	H
* 4.56501	53.71	PK2	33.8	-29.3	58.21	-	-	74	-15.79	54	101	H
* 7.30494	40.31	PK2	35.6	-23.4	52.51	-	-	74	-21.49	201	113	H
* 8.21649	39.97	PK2	35.8	-21.6	54.17	-	-	74	-19.83	142	115	H
* 9.13026	34.85	PK2	36.3	-20.4	50.75	-	-	74	-23.25	154	254	H
* 4.56503	56.96	PK2	33.8	-29.3	61.46	-	-	74	-12.54	0	126	V
* 3.65219	53.08	PK2	33	-30.3	55.78	-	-	74	-18.22	319	152	V
* 7.30528	37.16	PK2	35.6	-23.4	49.36	-	-	74	-24.64	316	107	V
* 8.21696	39.78	PK2	35.8	-21.6	53.98	-	-	74	-20.02	152	284	V
* 9.13208	34.34	PK2	36.3	-20.4	50.24	-	-	74	-23.76	186	257	V
5.47682	42.65	PK2	34.3	-26.1	50.85	-	-	-	-	288	275	H
6.39195	28.24	PK2	35.5	-26	37.74	-	-	-	-	340	330	H
5.47594	21.88	PK2	34.3	-26.1	30.08	-	-	-	-	203	103	V
6.39044	30.76	PK2	35.5	-26	40.26	-	-	-	-	282	400	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### HIGH CHANNEL RESULTS



**RADIATED EMISSIONS**

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.83747	54.58	PK2	30.7	-23.5	61.78	-	-	74	-12.22	152	183	H
1.83774	51.69	PK2	30.7	-23.5	58.89	-	-	74	-15.11	85	125	V

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

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.67598	48.23	MAV1	33	-29.2	52.03	54	-1.97	-	-	322	103	H
* 4.59433	44.21	MAV1	33.8	-28.3	49.71	54	-4.29	-	-	162	101	H
* 7.35277	29.09	MAV1	35.6	-22.3	42.39	54	-11.61	-	-	154	101	H
* 8.27254	29.06	MAV1	35.8	-21.2	43.66	54	-10.34	-	-	140	101	H
* 3.67635	46.58	MAV1	33	-29.2	50.38	54	-3.62	-	-	331	135	V
* 4.59443	45.2	MAV1	33.8	-28.3	50.7	54	-3.3	-	-	355	108	V
* 7.35171	26.11	MAV1	35.6	-22.3	39.41	54	-14.59	-	-	154	109	V
* 8.27057	28.45	MAV1	35.8	-21.2	43.05	54	-10.95	-	-	140	101	H
* 3.67552	54.04	PK2	33	-29.3	57.74	-	-	74	-16.26	322	103	H
* 4.59621	53.56	PK2	33.8	-28.3	59.06	-	-	74	-14.94	162	101	H
5.51388	45.3	PK2	34.3	-25.3	54.3	-	-	74	-19.7	103	120	H
6.43172	39.85	PK2	35.5	-25.3	50.05	-	-	74	-23.95	170	120	H
* 7.35118	40.06	PK2	35.6	-22.3	53.36	-	-	74	-20.64	154	101	H
* 8.2692	39.24	PK2	35.8	-21.2	53.84	-	-	74	-20.16	140	101	H
* 3.67691	52.74	PK2	33	-29.2	56.54	-	-	74	-17.46	331	135	V
* 4.59496	56.19	PK2	33.8	-28.3	61.69	-	-	74	-12.31	355	108	V
5.51358	41.76	PK2	34.3	-25.3	50.76	-	-	74	-23.24	340	120	V
6.43197	41.36	PK2	35.5	-25.3	51.56	-	-	74	-22.44	102	120	V
* 7.35194	37.54	PK2	35.6	-22.3	50.84	-	-	74	-23.16	154	109	V
* 8.27148	39.51	PK2	35.8	-21.2	54.11	-	-	74	-19.89	157	241	V

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

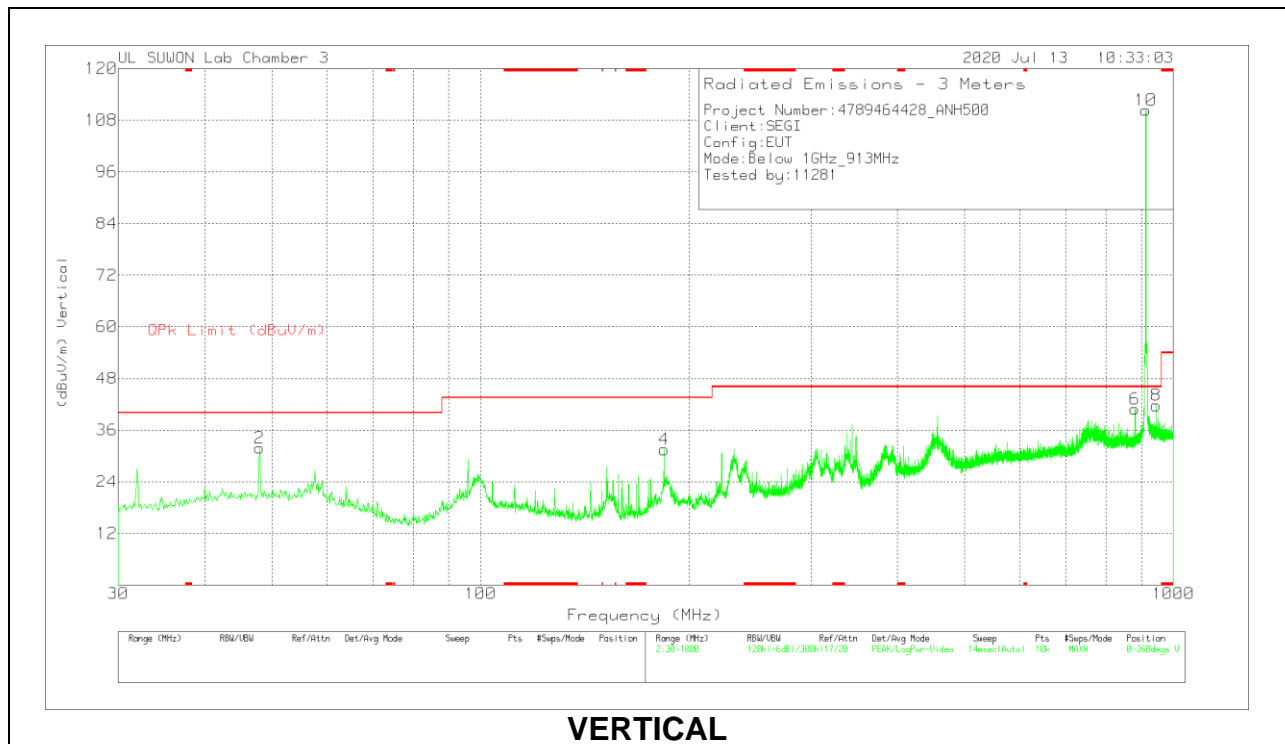
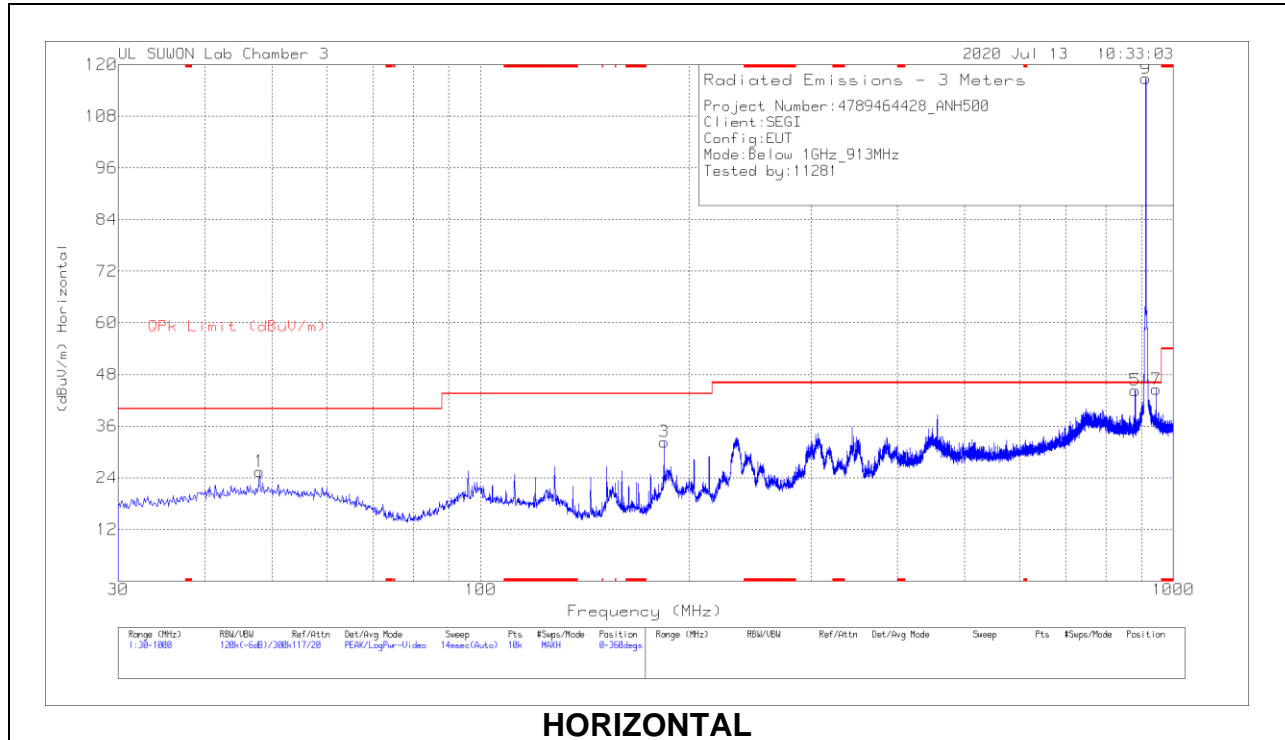
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average



### 10.3. WORST CASE BELOW 1 GHZ

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



## Below 1GHz Data

### Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-845	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.9469	37.36	Pk	20.1	-32	25.46	40	-14.54	0-360	400	H
3	184.0519	47.95	Pk	15.7	-31.3	32.35	43.52	-11.17	0-360	200	H
5	881.0687	45.24	Pk	27.8	-28.7	44.34	46.02	-1.68	0-360	200	H
7	944.9013	44.45	Pk	28.2	-28.1	44.55	46.02	-1.47	0-360	100	H
2	47.9469	43.73	Pk	20.1	-32	31.83	40	-8.17	0-360	100	V
4	184.0519	47.09	Pk	15.7	-31.3	31.49	43.52	-12.03	0-360	100	V
6	880.7777	41.79	Pk	27.8	-28.7	40.89	46.02	-5.13	0-360	200	V
8	944.9013	41.64	Pk	28.2	-28.1	41.74	46.02	-4.28	0-360	100	V

Pk - Peak detector

Note: Marker #9 & #10 is fundamental frequency.

## 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 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency.

### RESULTS (N/A)

The EUT is only supplied by vehicular battery.

## END OF TEST REPORT