



TEST REPORT

Report Number. : R13916296-E2

Applicant : Ademco Inc.
2 Corporate Center Dr.
Melville, NY 11747, U.S.A

Model : ADTZWMX

FCC ID : CFS8DLWFZWX

IC ID : 573F-WFZWX

EUT Description : Radio Module

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C: 2021
ISED RSS-210 Issue 10: 2019
ISED RSS-GEN ISSUE 5 + A2: 2021

Date Of Issue:
2021-09-23

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2021-09-23	Initial Issue	Haley Ackun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Ademco Inc.
2 Corporate Center Dr.
Melville, NY 11747, U.S.A

EUT DESCRIPTION: Radio Module

MODEL: ADTZWMX

SERIAL NUMBER: 200-01939V3 REV C

SAMPLE RECEIPT DATE: 2021-08-03

DATE TESTED: 2021-08-06 to 2021-09-21

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2021	Complies
ISED RSS-210 Issue 10: 2019	Complies
ISED RSS-GEN Issue 5 + A2: 2021	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.

Approved & Released For
UL LLC. By:



Mike Antola
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2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.249 (a)	RSS-210-B.10(a)	Fundamental Field Strength	Complies	None
15.205, 15.209, 15.249(a)	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-GEN 8.8	AC Mains Conducted Emissions	Complies	None.

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2021, ANSI C63.10-2013, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A2: 2021, and RSS-210 Issue 10: 2019.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by a2La, cert. # 0751.06 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: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	703469
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	703469

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%
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 radio module that supports 2.4 WLAN and Z-Wave. This report covers testing for the Z-Wave radio only.

6.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB trace antenna, with a maximum gain of 3.0 dBi.

6.3. SOFTWARE AND FIRMWARE

The EUT software installed during testing was 01.006571-162.

The test utility software used during testing was MicroRF LinkX.

6.4. WORST-CASE CONFIGURATION AND MODE

Radiated Emissions below 30 MHz and power line conducted emissions were performed with the EUT set to transmit at the channel with highest output fundamental field strength as worst-case scenario.

Radiated emissions below and above 1GHz were performed with the EUT set to transmit at the highest power at 908.42 MHz and 916 MHz. Channel 908.42 MHz was tested to cover channel 908.40 MHz as worst-case based on data rate.

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

The final power settings used for each channel are as follows:

908.40 MHz: power setting: 16

908.42 MHz: power setting 17

916 MHz: power setting 15

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	14-dk1003dx	5CG016B3DL	-
Power Supply	Resideo	ADS-25STA-12C	300-11260	-

I/O CABLES

Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length	Remarks
1	1	1	I/O	AC Mains	<3m	None

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM

Please refer to R13916296-EP1 for setup diagrams

7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10-2013 Section 11.6

20dB Bandwidth: ANSI C63.10-2013 Section 6.9.2

Occupied Bandwidth: ANSI C63.10-2013 Subclause 6.9.3

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

General Radiated Spurious Emissions: ANSI C63.10-2013, Section 6.3, 6.5, 6.6

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

8. TEST AND MEASUREMENT EQUIPMENT

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

Test 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	2021-04-05	2022-04-05
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2020-08-08	2021-08-08
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	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	2021-04-05	2022-04-05
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2021-04-01	2022-04-21
MY54490337	Spectrum Analyzer	Keysight Technologies	N9030A	2021-06-25	2022-06-22
SOFTEMI	Antenna Port Software	UL	Version 2021.05.28	NA	NA

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0059	Active Loop Antenna	EMCO	6502	2020-08-06	2021-08-31
	30-1000 MHz				
206210	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-03-11	2022-03-11
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-03-11	2022-03-11
	Gain-Loss Chains				
C4-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2021-05-07	2022-05-07
C4-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-05-07	2022-05-07
C4-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-05-07	2022-05-07
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-09	2022-03-09
SOFTEMI	EMI Software	UL	Version 9.5 (28 Jun 2021)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-21	2022-01-21
BRF007	902-928MHz notch filter	Micro-Tronics	BRC17691	2021-07-21	2022-07-21
HPF012	1GHz high-pass filter, 2W, F _{high} = 18GHz	Micro-Tronics	HPM18129	2021-02-15	2022-02-15

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2021-02-19	2022-02-19
	Gain-Loss Chains				
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-07-20	2022-07-20
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-30	2022-03-30
SOFTEMI	EMI Software	UL	Version 9.5 (24 Jun 2021)		
	Additional Equipment used				
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2020-08-06	2021-08-31
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-21	2022-01-21

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
	Gain-Loss Chains				
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-07-09	2022-07-09
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SOFTEMI	EMI Software	UL	Version 9.5 (24 Jun 2021)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22

*Note: All equipment was in cal at the time testing was performed.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

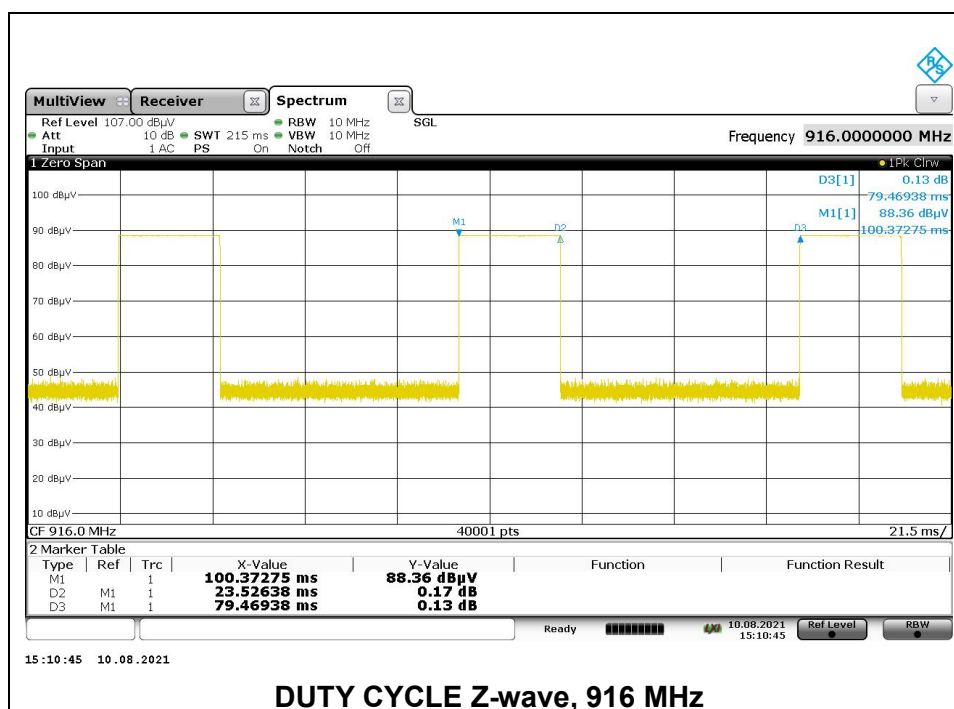
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ANSI C63.10 Section 11.6

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)
Z-wave- 916 MHz	23.526	79.469	0.296	29.60%	10.57	0.043



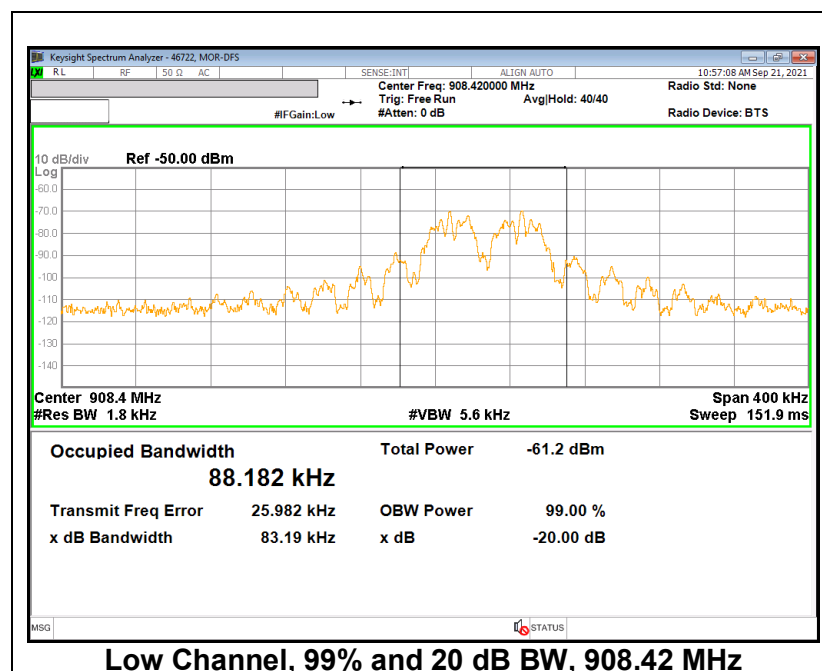
9.2. 99% AND 20dB BANDWIDTH

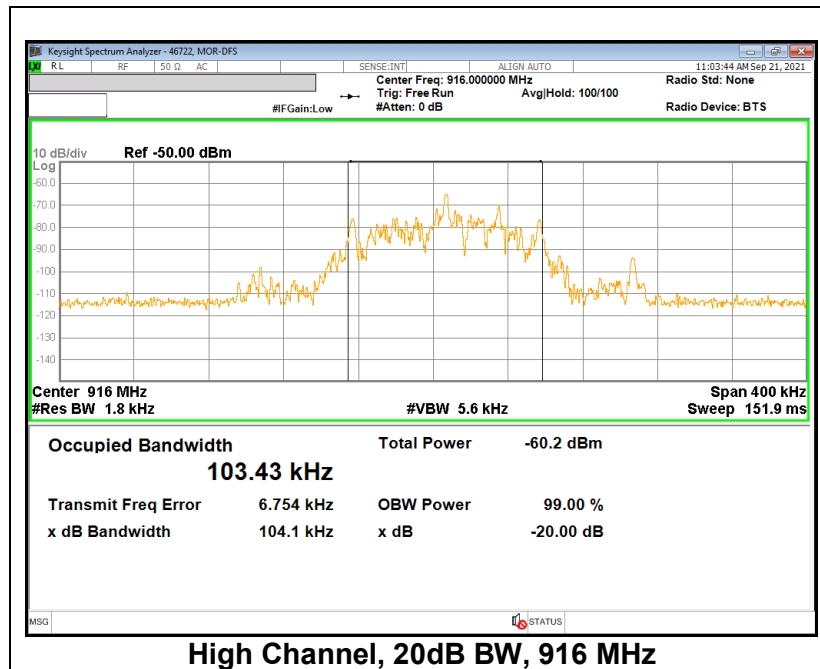
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	908.42	0.08319	0.08818
High	916	0.1041	0.10343





10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

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

FCC §15.249(a)

Frequency Range (MHz)	Field Strength Limit of Fundamental (mV/m) at 3 m	Field Strength Limit of Harmonics (uV/m) at 3 m
902-928	50	500

RSS-210 B.10(a)

Frequency Range (MHz)	Field Strength Limit of Fundamental (mV/m) at 3 m	Field Strength Limit of Harmonics (mV/m) at 3 m
902-928	50	0.5

RSS-GEN, Section 8.9 and 8.10

Frequency Range (MHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuA/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
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.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz 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 linear voltage averaging measurements.

The spectrum from 1 GHz to 10 GHz and below 1 GHz is investigated with the transmitter set to 908.42 MHz and 916 MHz.

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.

10.1. FUNDAMENTAL

908.40 MHz Results

Project Number:	13916296
Client:	Ademco
Test Location:	S-SAC
Mode:	1 Tx, 908.40 MHz
Tested by:	85501/46722
Date:	2021-09-15

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QP Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
908.4154	58.1	Qp	28.5	6.4	93	94	-1	338	102	H
908.4182	54.47	Qp	28.5	6.4	89.37	94	-4.63	59	117	V

Qp - Quasi-Peak detector

908.42 MHz Results

Project Number:	13916296
Client:	Ademco
Test Location:	N-SAC
Mode:	1 Tx, 908.42 MHz
Tested by:	85501/46722
Date:	2021-09-15

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QP Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
908.4176	58.72	Qp	28.5	6.4	93.62	94	-.38	336	103	H
908.4176	55.51	Qp	28.5	6.4	90.41	94	-3.59	60	120	V

Qp - Quasi-Peak detector

916MHz Results

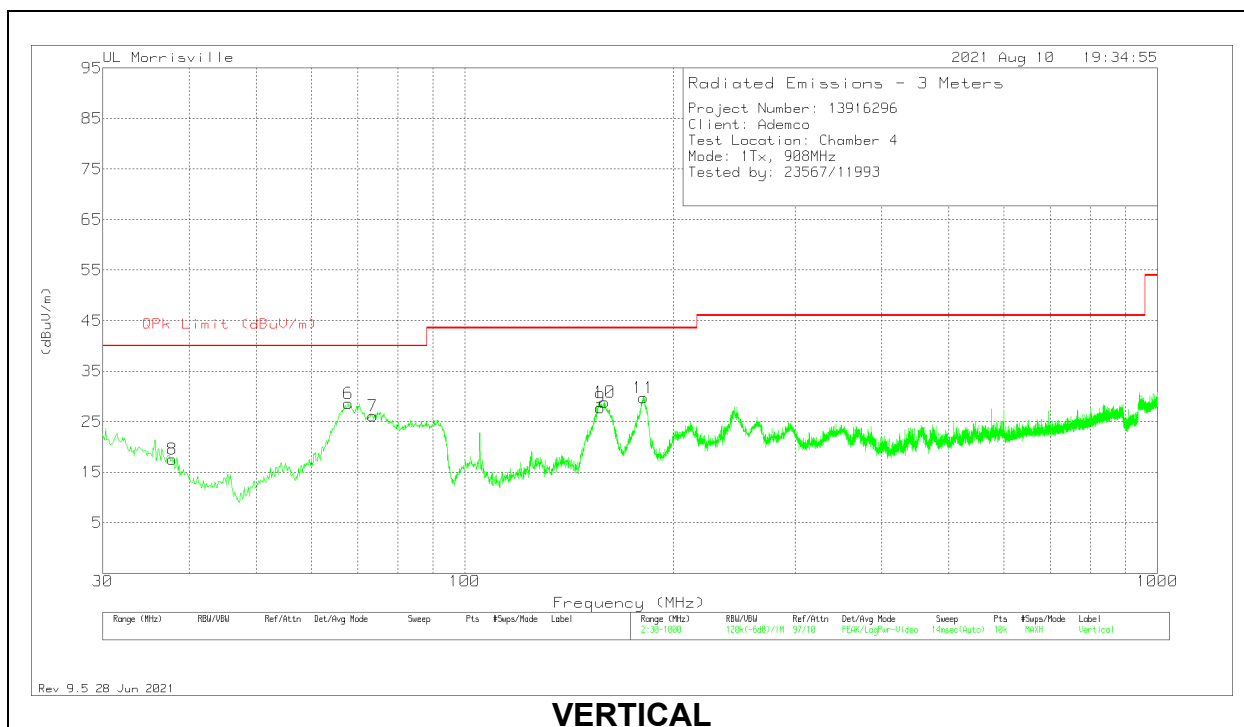
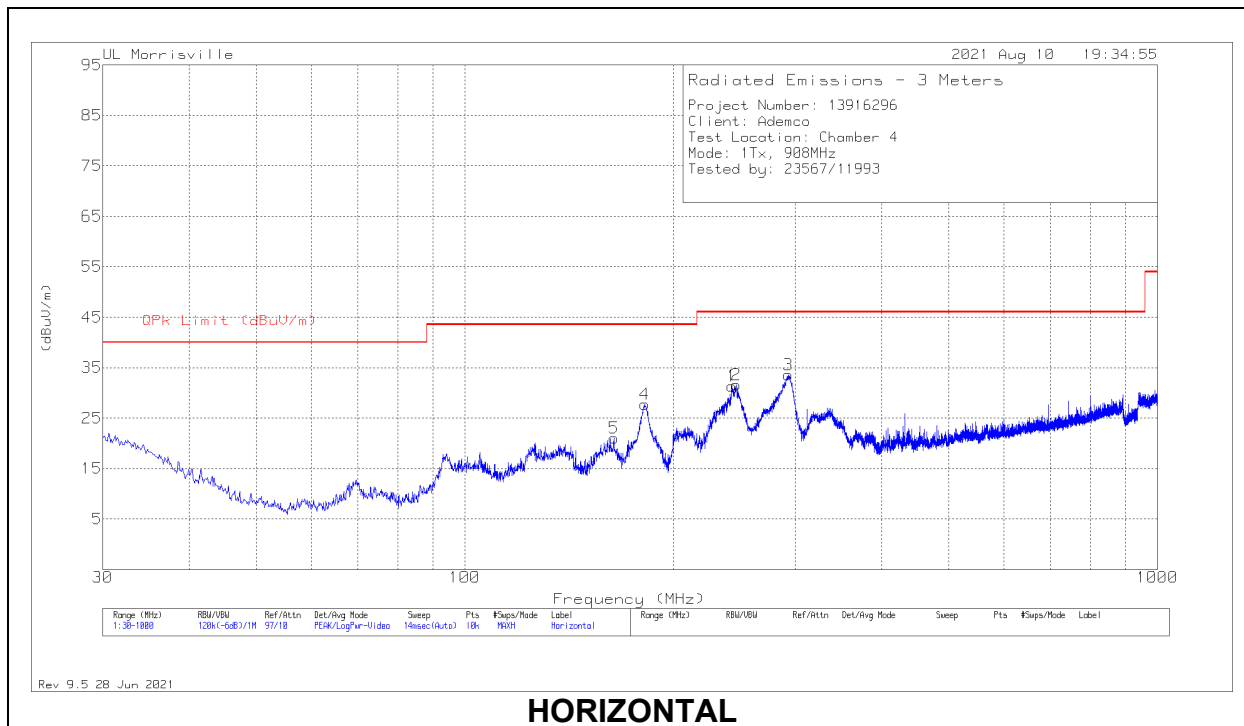
Project Number:	13916296
Client:	Ademco
Test Location:	N-SAC
Mode:	1 Tx, 916 MHz
Tested by:	86517/46722
Date:	2021-09-17

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QP Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
915.9699	55.55	Qp	28.7	6.5	90.75	94	-3.25	73	126	V
915.9715	58.78	Qp	28.7	6.5	93.98	94	-.02	305	103	H

Qp - Quasi-Peak detector

10.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz

908.42 MHz RESULTS



RADIATED EMISSIONS

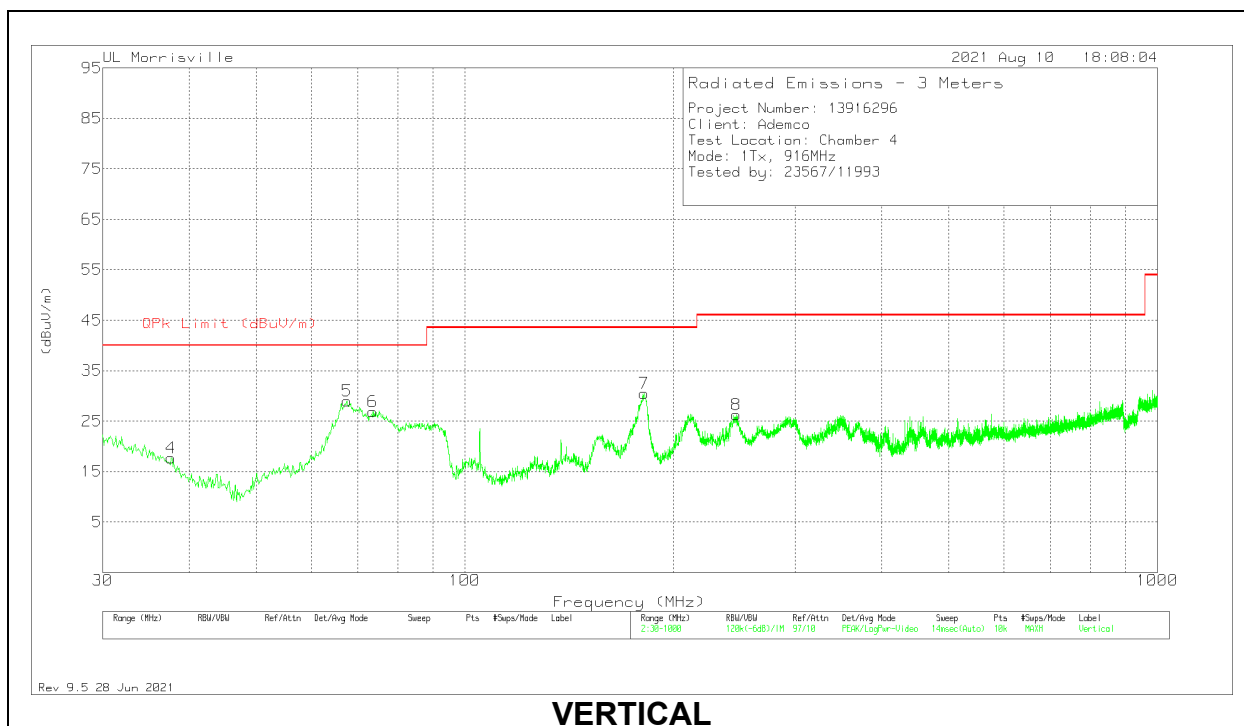
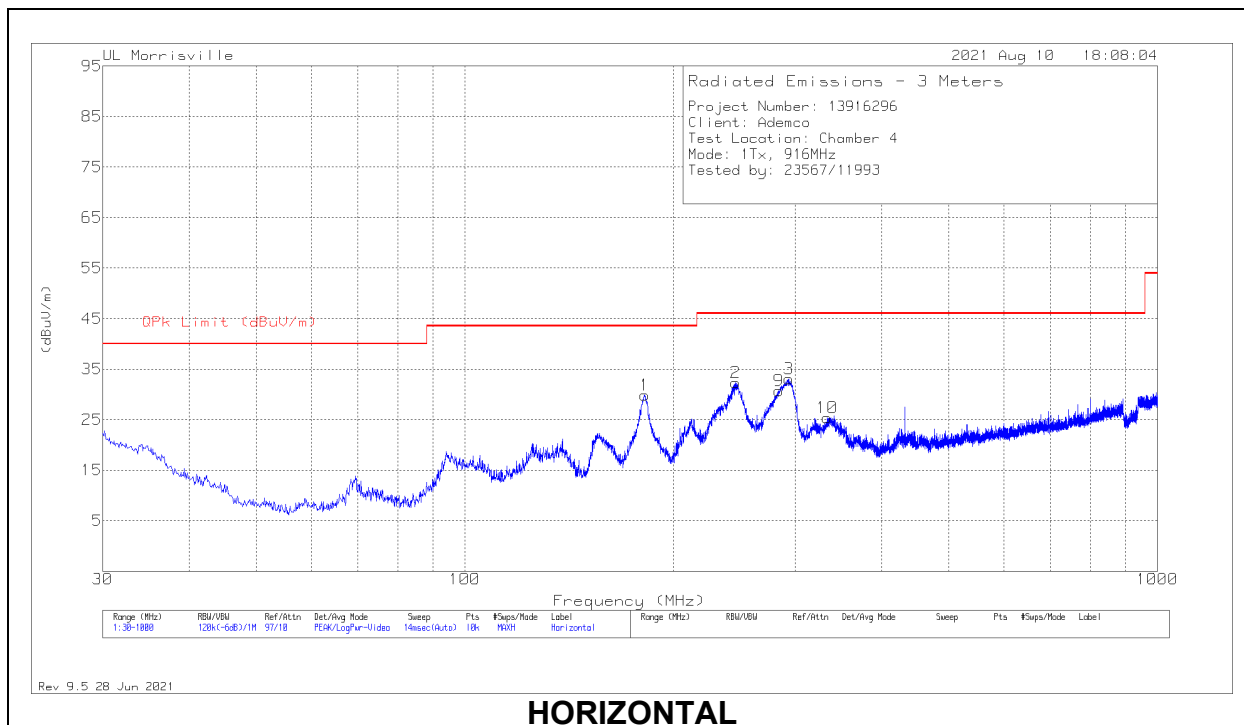
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206210 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 242.7695	43.4	Pk	16.2	-28.6	.3	31.3	46.02	-14.72	0-360	100	H
2	* ** 246.31	43.84	Pk	16.1	-28.6	.3	31.64	46.02	-14.38	0-360	100	H
5	* ** 164.151	33.64	Pk	16.5	-29.4	.3	21.04	43.52	-22.48	0-360	100	H
7	* ** 73.553	44.26	Pk	12.3	-30.6	.2	26.16	40	-13.84	0-360	100	V
8	* ** 37.76	28.46	Pk	20.1	-31.1	.1	17.56	40	-22.44	0-360	100	V
9	* ** 156.779	40.18	Pk	16.7	-29.4	.3	27.78	43.52	-15.74	0-360	100	V
6	67.83	46.56	Pk	12.4	-30.6	.2	28.56	40	-11.44	0-360	100	V
10	159.301	41.33	Pk	16.6	-29.4	.3	28.83	43.52	-14.69	0-360	100	V
11	181.126	43.15	Pk	15.5	-29.2	.3	29.75	43.52	-13.77	0-360	100	V
4	181.999	41.18	Pk	15.5	-29.2	.3	27.78	43.52	-15.74	0-360	100	H
3	293.064	43.65	Pk	17.9	-28.3	.3	33.55	46.02	-12.47	0-360	100	H

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

916 MHz RESULTS



RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206210 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* ** 245.922	44.51	Pk	16.1	-28.6	.3	32.31	46.02	-13.71	0-360	100	H
9	* ** 283.849	41.05	Pk	17.8	-28.4	.3	30.75	46.02	-15.27	0-360	100	H
10	* ** 333.804	34.37	Pk	18.7	-28	.3	25.37	46.02	-20.65	0-360	100	H
4	* ** 37.663	28.64	Pk	20.1	-31.1	.1	17.74	40	-22.26	0-360	100	V
6	* ** 73.65	44.93	Pk	12.3	-30.6	.2	26.83	40	-13.17	0-360	100	V
8	* ** 246.31	38.41	Pk	16.1	-28.6	.3	26.21	46.02	-19.81	0-360	100	V
5	67.539	46.96	Pk	12.4	-30.6	.2	28.96	40	-11.04	0-360	100	V
7	181.4655	43.83	Pk	15.5	-29.2	.3	30.43	43.52	-13.09	0-360	100	V
1	181.805	43.28	Pk	15.5	-29.2	.3	29.88	43.52	-13.64	0-360	100	H
3	293.549	43.22	Pk	17.9	-28.3	.3	33.12	46.02	-12.9	0-360	100	H

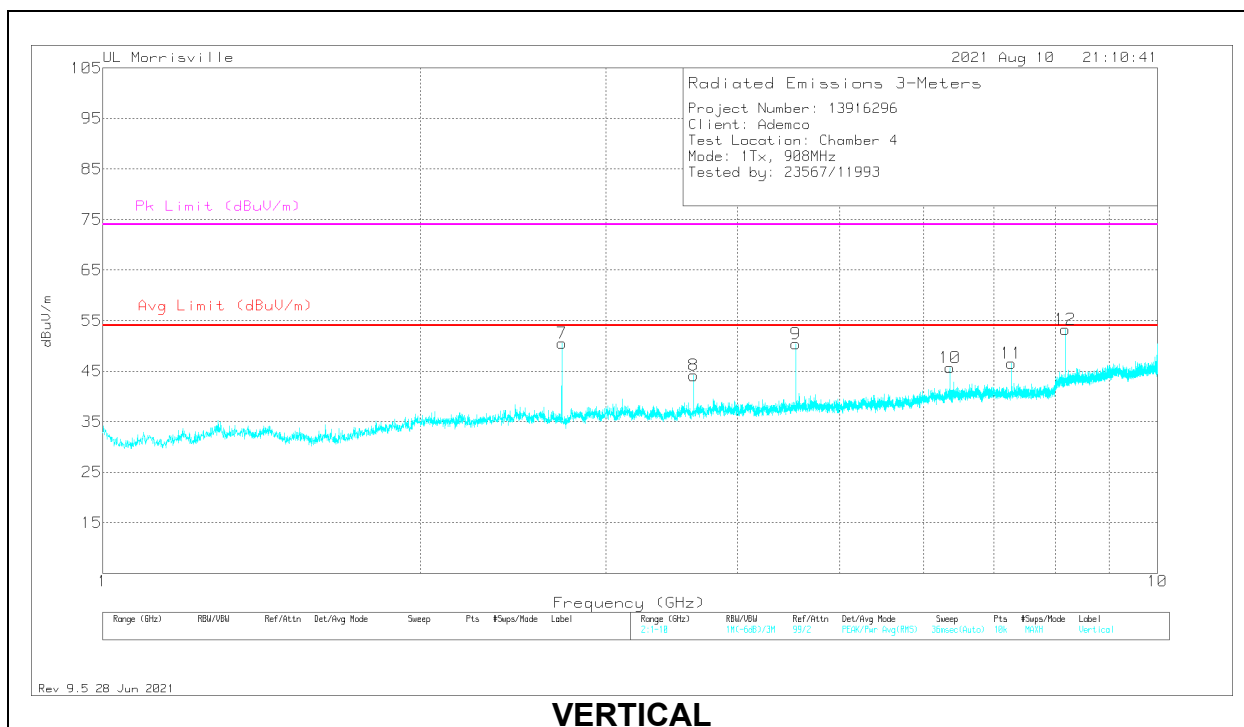
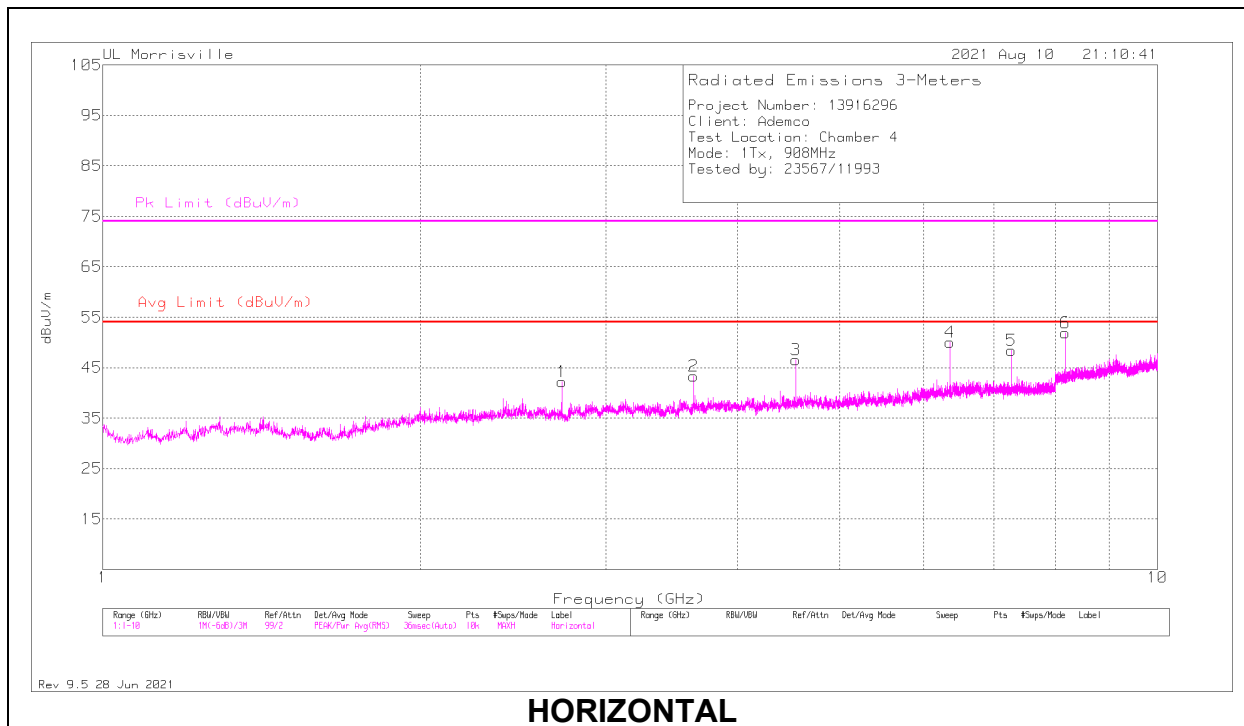
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz

908.42 MHz RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading dBuV/m	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	*** 7.26733	45.88	PK2	35.5	-29.4	.5	0	52.48	-	-	74	-21.52	176	100	H
	*** 7.26736	33.66	ADV	35.5	-29.4	.5	10.57	50.83	54	-3.17	-	-	176	100	H
6	*** 8.17606	46.76	PK2	35.7	-28.6	.5	0	54.36	-	-	74	-19.64	347	197	H
	*** 8.17588	34.24	ADV	35.7	-28.6	.5	10.57	52.41	54	-1.59	-	-	347	197	H
7	*** 2.72531	54.42	PK2	31.7	-36.5	.5	0	50.12	-	-	74	-23.88	219	257	V
	*** 2.72529	42.88	ADV	31.7	-36.5	.5	10.57	49.15	54	-4.85	-	-	219	257	V
9	*** 4.54209	48.39	PK2	33.9	-32.8	.4	0	49.89	-	-	74	-24.11	357	100	V
	*** 4.54216	36.89	ADV	33.9	-32.8	.4	10.57	48.96	54	-5.04	-	-	357	100	V
12	*** 8.17604	44.62	PK2	35.7	-28.6	.5	0	52.22	-	-	74	-21.78	190	291	V
	*** 8.17595	32.37	ADV	35.7	-28.6	.5	10.57	50.54	54	-3.46	-	-	190	291	V
1	*** 2.7253	46.53	Pk	31.7	-36.5	.5	0	42.23	54	-11.77	74	-31.77	0-360	100	H
2	*** 3.6334	44.28	Pk	33.1	-34.6	.5	0	43.28	54	-10.72	74	-30.72	0-360	200	H
3	*** 4.5424	45.07	Pk	33.9	-32.8	.4	0	46.57	54	-7.43	74	-27.43	0-360	100	H
8	*** 3.6334	45.14	Pk	33.1	-34.6	.5	0	44.14	54	-9.86	74	-29.86	0-360	200	V
11	*** 7.2676	39.96	Pk	35.5	-29.4	.5	0	46.56	54	-7.44	74	-27.44	0-360	400	V

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

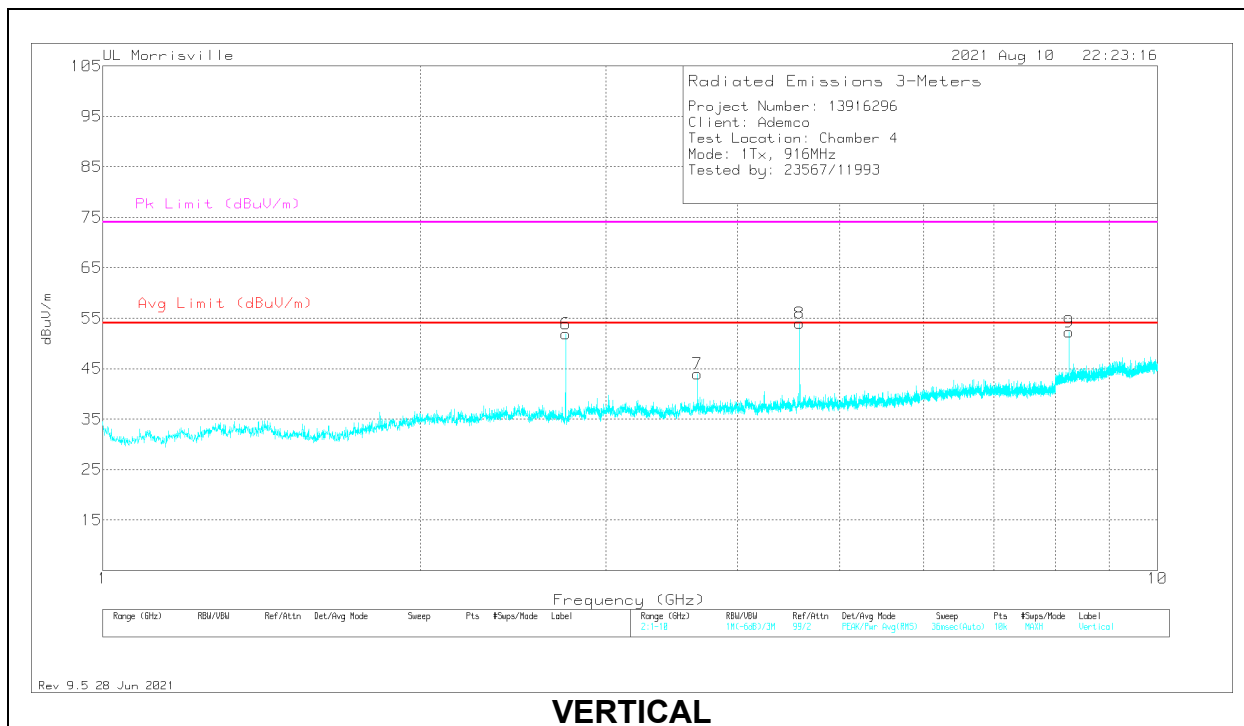
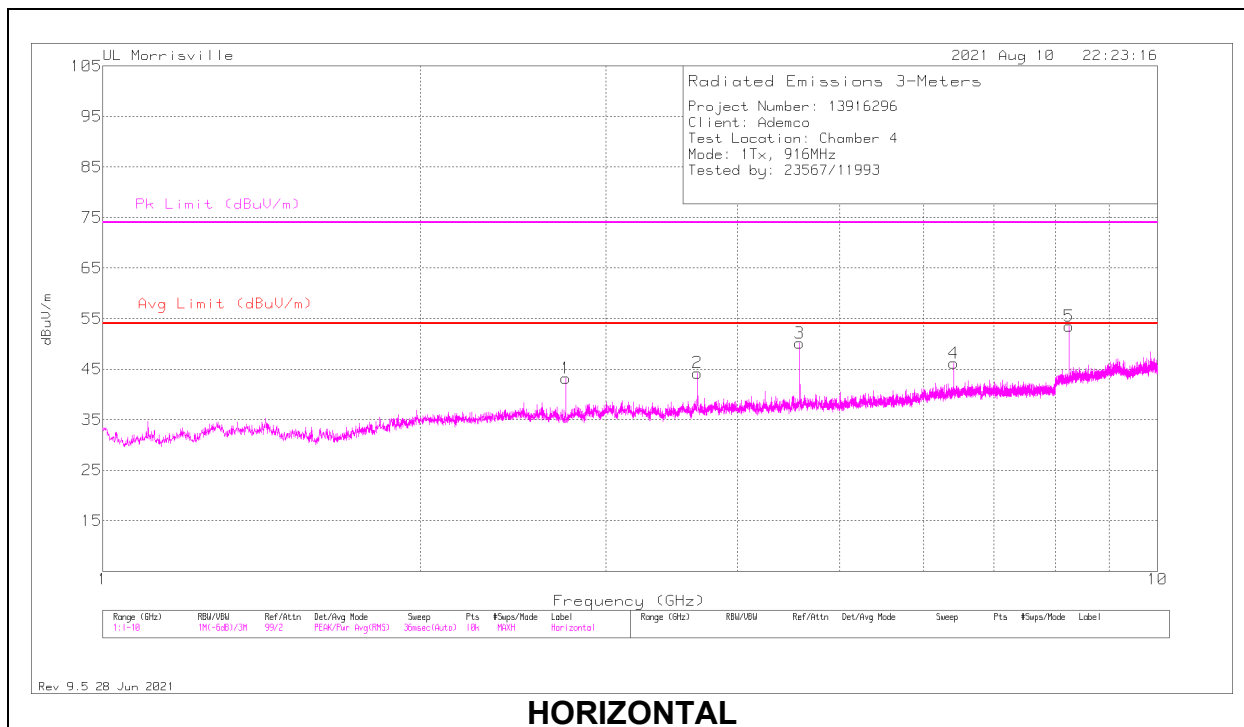
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

916 MHz RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading dBuV/m	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	*** 4.58022	52.08	PK2	34.1	-32.8	.4	0	53.78	-	-	74	-20.22	161	119	H
	*** 4.58019	40	ADV	34.1	-32.8	.4	10.57	52.27	54	-1.73	-	-	161	119	H
5	*** 8.24405	47.25	PK2	35.7	-28.5	.5	0	54.95	-	-	74	-19.05	248	250	H
	*** 8.24435	35.49	ADV	35.7	-28.5	.5	10.57	53.76	54	-2.24	-	-	248	250	H
6	*** 2.74803	56.93	PK2	31.9	-36.5	.5	0	52.83	-	-	74	-21.17	212	171	V
	*** 2.74812	45.19	ADV	32	-36.5	.5	10.57	51.76	54	-2.24	-	-	212	171	V
8	*** 4.58013	46.91	PK2	34.1	-32.8	.4	0	48.61	-	-	74	-25.39	2	188	V
	*** 4.58022	34.48	ADV	34.1	-32.8	.4	10.57	46.75	54	-7.25	-	-	2	188	V
9	*** 8.24454	41.65	PK2	35.7	-28.5	.5	0	49.35	-	-	74	-24.65	17	156	V
	*** 8.24426	28.91	ADV	35.7	-28.5	.5	10.57	47.18	54	-6.82	-	-	17	156	V
1	*** 2.7478	47.25	Pk	31.9	-36.5	.5	0	43.15	54	-10.85	74	-30.85	0-360	100	H
2	*** 3.664	45.36	Pk	33.1	-34.7	.5	0	44.26	54	-9.74	74	-29.74	0-360	100	H
7	*** 3.664	45.03	Pk	33.1	-34.7	.5	0	43.93	54	-10.07	74	-30.07	0-360	200	V
4	6.4126	40.45	Pk	35.3	-30.3	.7	0	46.15	-	-	-	-	0-360	100	H

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

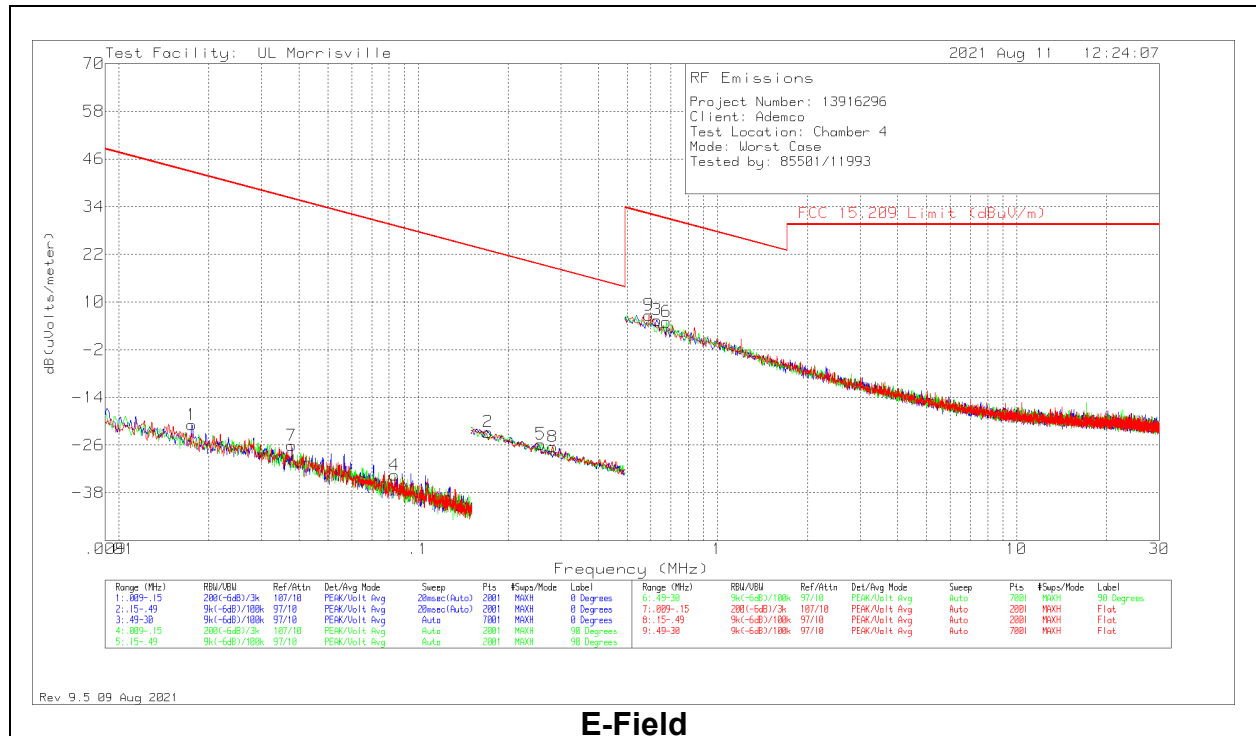
ADV - Linear Voltage Average

Pk - Peak detector

10.4. SPURIOUS EMISSIONS BELOW 30 MHz

WORST-CASE CONFIGURATION

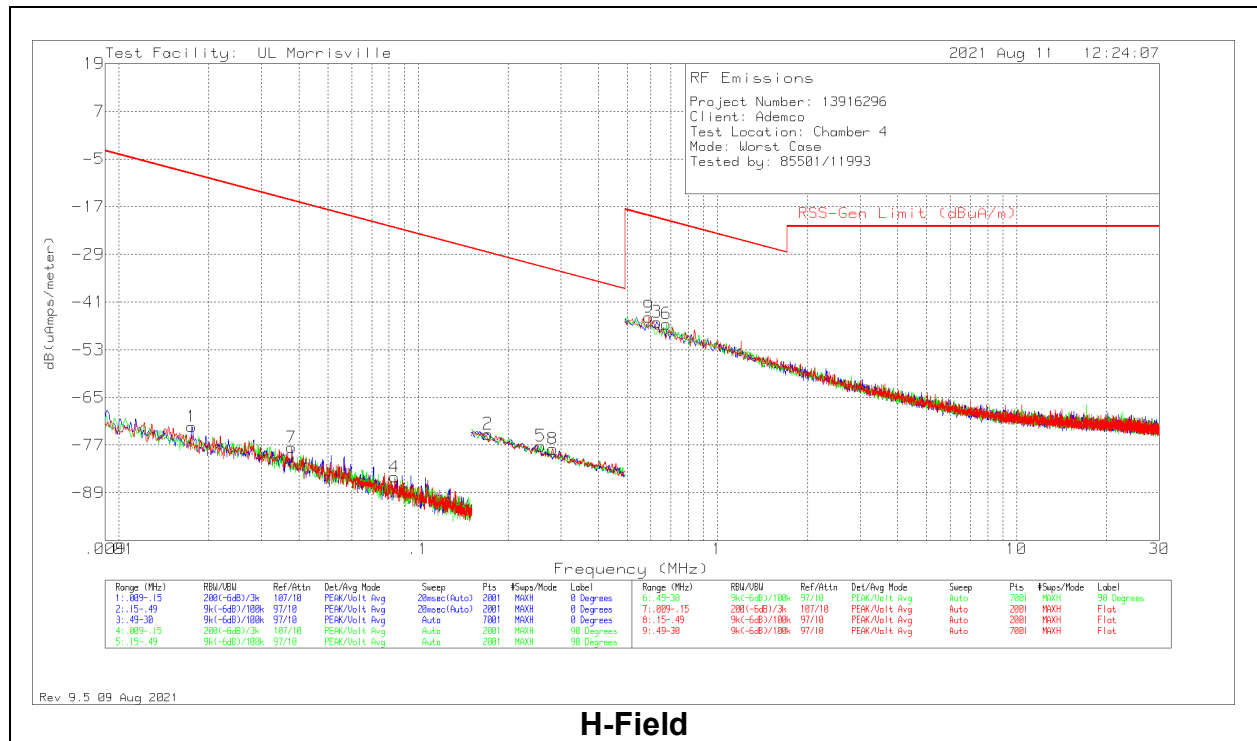
Note for below 30 MHz scans: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions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



E-Field

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0059 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Qp/AvLimit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.01752	43.73	Pk	15.3	.1	-80	-20.87	42.73	62.73	-63.6	0-360	100	0 degs
7	.03776	41.3	Pk	12.5	.1	-80	-26.1	36.07	56.07	-62.17	0-360	100	Flat
4	.08341	35.66	Pk	10.7	.1	-80	-33.54	29.18	49.18	-62.72	0-360	100	90 degs
2	.17151	46.8	Pk	10.4	.1	-80	-22.7	22.92	42.92	-45.62	0-360	100	0 degs
5	.2571	43.98	Pk	10.2	.1	-80	-25.72	19.4	39.4	-45.12	0-360	100	90 degs
8	.28133	43.26	Pk	10.2	.1	-80	-26.44	18.62	38.62	-45.06	0-360	100	Flat
9	.59118	36.12	Pk	10.4	.2	-40	6.72	32.17	-	-25.45	0-360	100	Flat
3	.62913	34.88	Pk	10.4	.2	-40	5.48	31.63	-	-26.15	0-360	100	0 degs
6	.6755	34.52	Pk	10.3	.2	-40	5.02	31.01	-	-25.99	0-360	100	90 degs

Pk - Peak detector



H-Field

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0059 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	RSS-GEN Qp/Av Limit (dBuA/m)	RSS-GEN Pk Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.01752	43.73	Pk	-36.2	.1	-80	-72.37	-8.77	11.23	-63.6	0-360	100	0 degs
7	.03776	41.3	Pk	-39	.1	-80	-77.6	-15.43	4.57	-62.17	0-360	100	Flat
4	.08341	35.66	Pk	-40.8	.1	-80	-85.04	-22.32	-2.32	-62.72	0-360	100	90 degs
2	.17151	46.8	Pk	-41.1	.1	-80	-74.2	-28.58	-8.58	-45.62	0-360	100	0 degs
5	.2571	43.98	Pk	-41.3	.1	-80	-77.22	-32.1	-12.1	-45.12	0-360	100	90 degs
8	.28133	43.26	Pk	-41.3	.1	-80	-77.94	-32.88	-12.88	-45.06	0-360	100	Flat
9	.59118	36.12	Pk	-41.1	.2	-40	-44.78	-19.33	-	-25.45	0-360	100	Flat
3	.62913	34.88	Pk	-41.1	.2	-40	-46.02	-19.87	-	-26.15	0-360	100	0 degs
6	.6755	34.52	Pk	-41.2	.2	-40	-46.48	-20.49	-	-25.99	0-360	100	90 degs

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

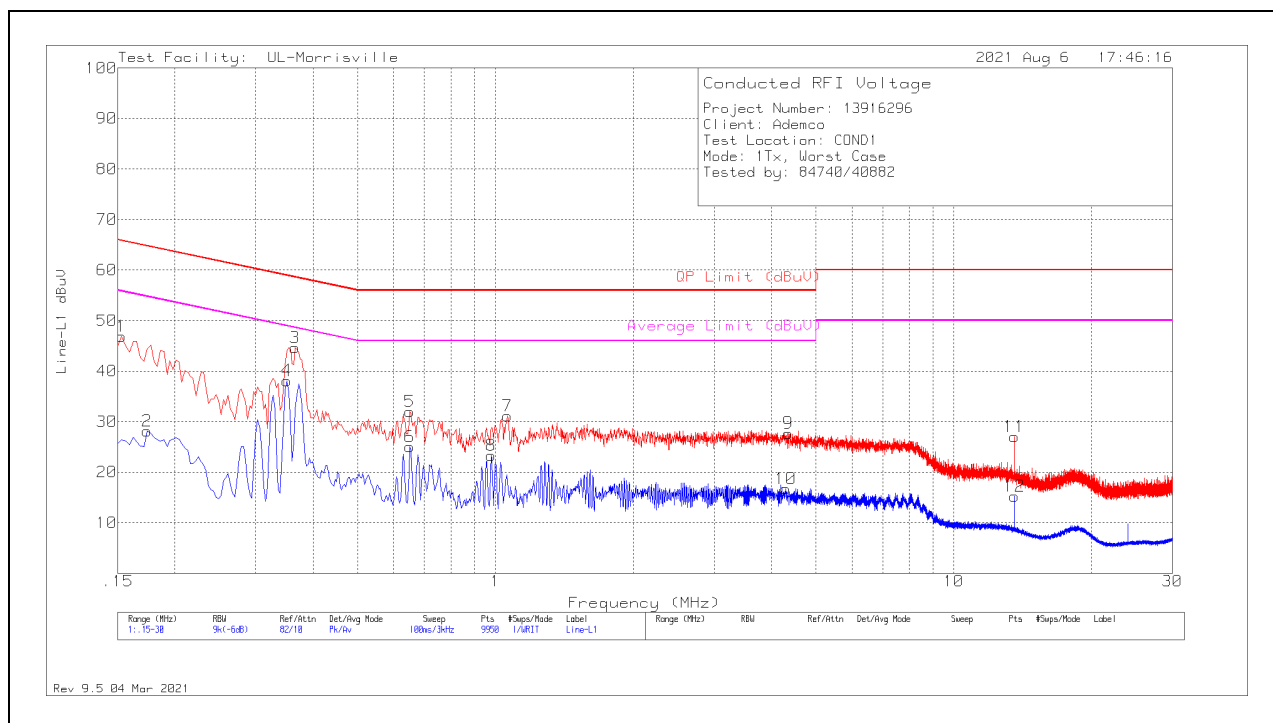
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

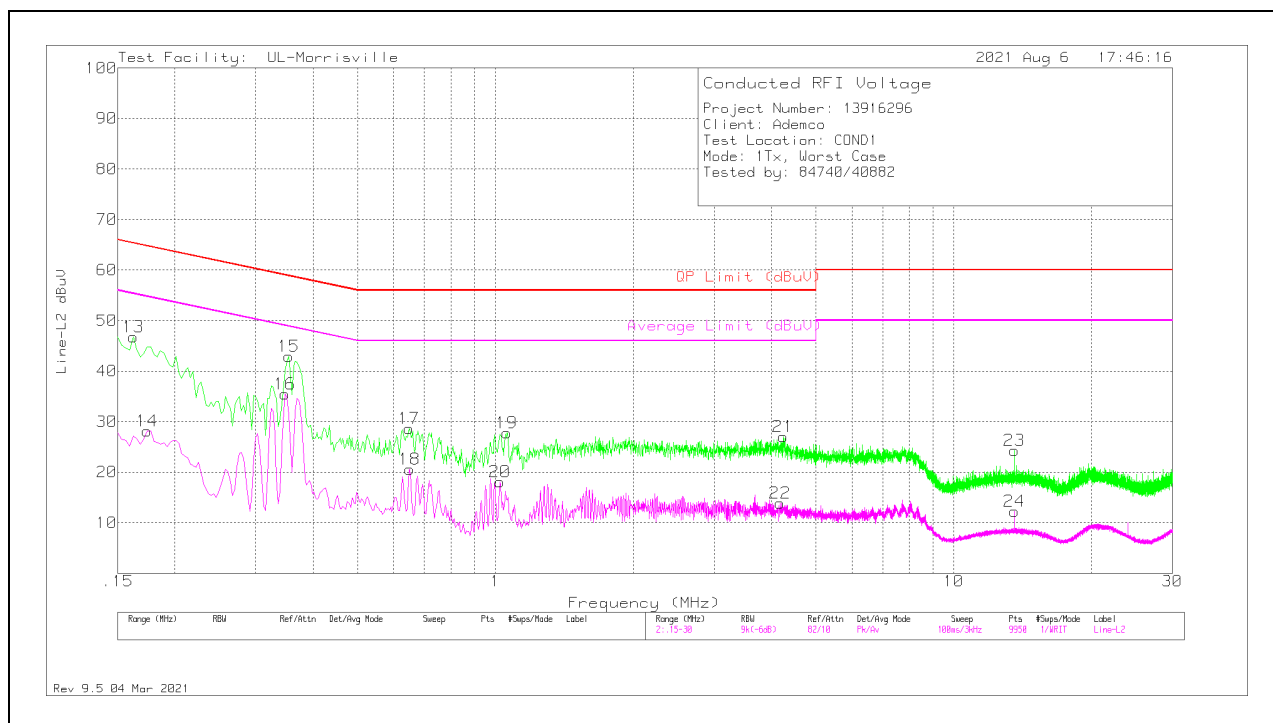
LINE 1 RESULTS



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	.153	36.94	Pk	.2	9.8	46.94	65.84	-18.9	-	-
2	.174	18.17	Av	.2	9.8	28.17	-	-	54.77	-26.6
4	.351	28.24	Av	.1	9.8	38.14	-	-	48.94	-10.8
3	.366	34.78	Pk	.1	9.8	44.68	58.59	-13.91	-	-
5	.651	22.18	Pk	0	9.8	31.98	56	-24.02	-	-
6	.651	15.19	Av	0	9.8	24.99	-	-	46	-21.01
8	.978	13.52	Av	0	9.8	23.32	-	-	46	-22.68
7	1.062	21.36	Pk	0	9.8	31.16	56	-24.84	-	-
10	4.305	6.83	Av	0	9.9	16.73	-	-	46	-29.27
9	4.353	17.81	Pk	0	9.9	27.71	56	-28.29	-	-
12	13.56	5.01	Av	.1	10.1	15.21	-	-	50	-34.79
11	13.563	16.85	Pk	.1	10.1	27.05	60	-32.95	-	-

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)
13	.162	36.81	Pk	.2	9.8	46.81	65.36	-18.55	-	-
14	.174	18.11	Av	.2	9.8	28.11	-	-	54.77	-26.66
16	.348	25.62	Av	.1	9.8	35.52	-	-	49.01	-13.49
15	.354	33.07	Pk	.1	9.8	42.97	58.87	-15.9	-	-
17	.648	18.88	Pk	0	9.8	28.68	56	-27.32	-	-
18	.651	10.81	Av	0	9.8	20.61	-	-	46	-25.39
20	1.023	8.32	Av	0	9.8	18.12	-	-	46	-27.88
19	1.059	18.02	Pk	0	9.8	27.82	56	-28.18	-	-
22	4.179	3.91	Av	.1	9.9	13.91	-	-	46	-32.09
21	4.245	17.08	Pk	.1	9.9	27.08	56	-28.92	-	-
23	13.56	14.14	Pk	.1	10.1	24.34	60	-35.66	-	-
24	13.56	2.11	Av	.1	10.1	12.31	-	-	50	-37.69

Pk - Peak detector
Av - Average detection

12. SETUP PHOTOS

Please refer to R13916296-EP1 for setup photos

END OF TEST REPORT