FCC Part 15C
Measurement and Test Report

For

Allied Safety Systems Inc

4150 St. Johns Parkway, Suite 1002, Sanford, FL 32771 USA

FCC ID: 2ATWQ- PROXIMITY1

FCC Rule(s):	FCC Part 15.249
Product Description:	HIGH VOLTAGE WIRELESS PROXIMITY (SENSOR)
Tested Model:	PROXIMITY1
Report No.:	WTX19X06043039W
Sample Receipt Date:	2019-06-28
Tested Date:	2019-06-28 to 2019-07-03
Issued Date:	2019-07-03
Tested By:	Mike Shi / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C.（518101）
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION 3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
1.2 TEST STANDARDS 4
1.3 TEST METHODOLOGY 4
1.4 TEST FACILITY 4
1.5 EUT SETUP AND TEST MODE 5
1.6 MEASUREMENT UNCERTAINTY 5
1.7 TEST EQUIPMENT LIST AND DETAILS 6
2. SUMMARY OF TEST RESULTS 8
3. ANTENNA REQUIREMENTS 9
3.1 STANDARD APPLICABLE 9
3.2 TEST RESULT 9
4. RADIATED EMISSIONS 10
4.1 STANDARD APPLICABLE 10
4.2 TEST PROCEDURE 10
4.3 CORRECTED AMPLITUDE & MARGIN CALCULATION 12
4.4 SUMMARY OF TEST RESULTS/PLOTS 12
5. OUT OF BAND EMISSIONS 16
5.1 STANDARD APPLICABLE 16
5.2 TEST PROCEDURE 16
5.3 SUMMARY OF TEST RESULTS/PLOTS 16
6. EMISSION BANDWIDTH 19
6.1 STANDARD APPLICABLE 19
6.2 TEST PROCEDURE 19
6.3 SUMMARY OF TEST RESULTS/PLOTS 19
7. CONDUCTED EMISSIONS 21
7.1 TEST PROCEDURE 21
7.2 BASIC TEST SETUP BLOCK DIAGRAM 21
7.3 TEST RECEIVER SETUP 21
7.4 SUMMARY OF TEST RESULTS/PLOTS 21

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Allied Safety Systems Inc
Address of applicant:	4150 St. Johns Parkway, Suite 1002, Sanford, FL 32771 USA
Manufacturer:	Allied Safety Systems Inc
Address of manufacturer:	4150 St. Johns Parkway, Suite 1002, Sanford, FL 32771 USA

General Description of EUT	
Product Name:	HIGH VOLTAGE WIRELESS PROXIMITY (SENSOR)
Trade Name:	Allied Safety Systems
Model No.:	PROXIMITY1
Adding Model(s):	/
Rated Voltage:	Battery:DC3.7V
Power Adapter Model:	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	916MHz
Max. Field Strength:	56.39dBuV/m
Modulation:	BPSK
Quantity of Channels:	1
Antenna Type:	Integral Antenna
Antenna Gain:	-10.2dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013.
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Shenzhen SEM Test Technology Co., Ltd.

Address: 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101）

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Transmit	916MHz

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Cable	1.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Adapter	/	NS-ACF2MS	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2019-04-30	2020-04-29
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2019-04-30	2020-04-29
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2019-04-30	2020-04-29
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2019-04-30	2020-04-29
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2019-04-30	2020-04-29
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
SEMT-1042	Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2019-05-05	2021-05-04
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2019-04-30	2020-04-29
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2019-04-30	2020-04-29
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2019-04-30	2020-04-29
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2019-04-30	2020-04-29
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2019-04-30	2020-04-29
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2019-04-30	2020-04-29
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2019-05-05	2021-05-04
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2019-04-30	2020-04-29
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2019-04-30	2020-04-29
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2019-04-30	2020-04-29
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2019-03-18	2020-03-17
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2019-03-18	2020-03-17
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2019-03-18	2020-03-17
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2019-03-18	2020-03-17
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2019-03-18	2020-03-17
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2019-03-18	2020-03-17

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	CCS	EZ-EMC	V1.0
EMI Test Software (Conducted Emission)*	CCS	EZ-EMC	V1.0

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.209(a)(f)	Radiated Spurious Emissions	Compliant
§15.249(a)	Field Strength of Emissions	Compliant
§15.249(d)	Out of Band Emission	Compliant
§15.215(c)	Emission Bandwidth	Compliant

3. Antenna Requirements

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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.

3.2 Test Result

This product has an integral antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

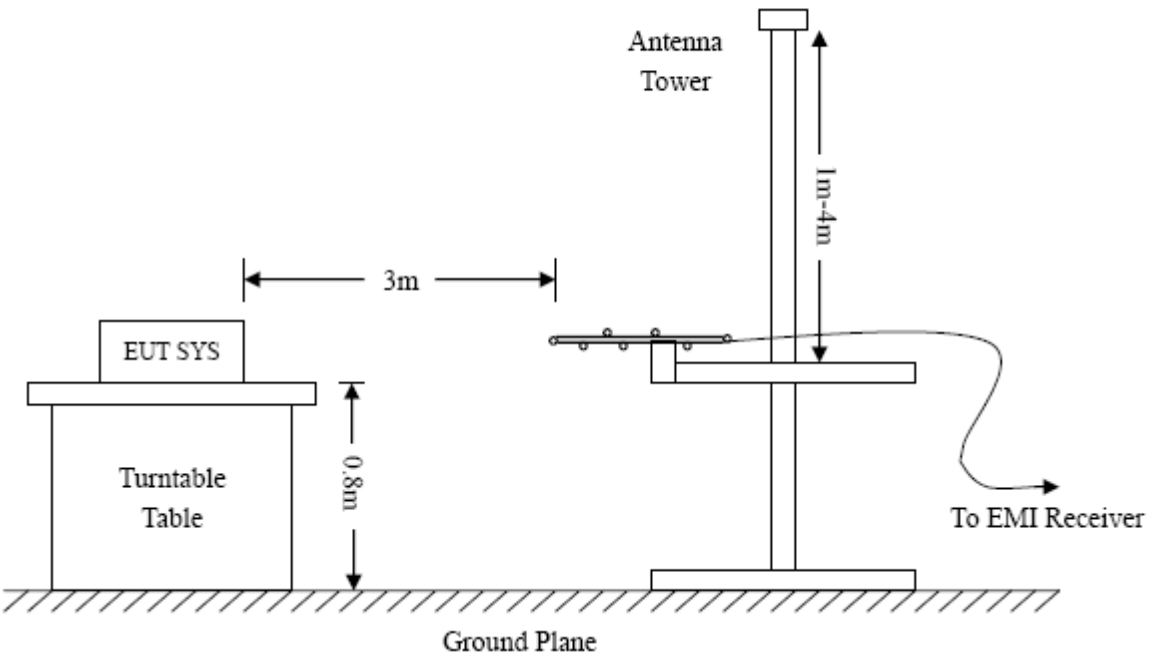
Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

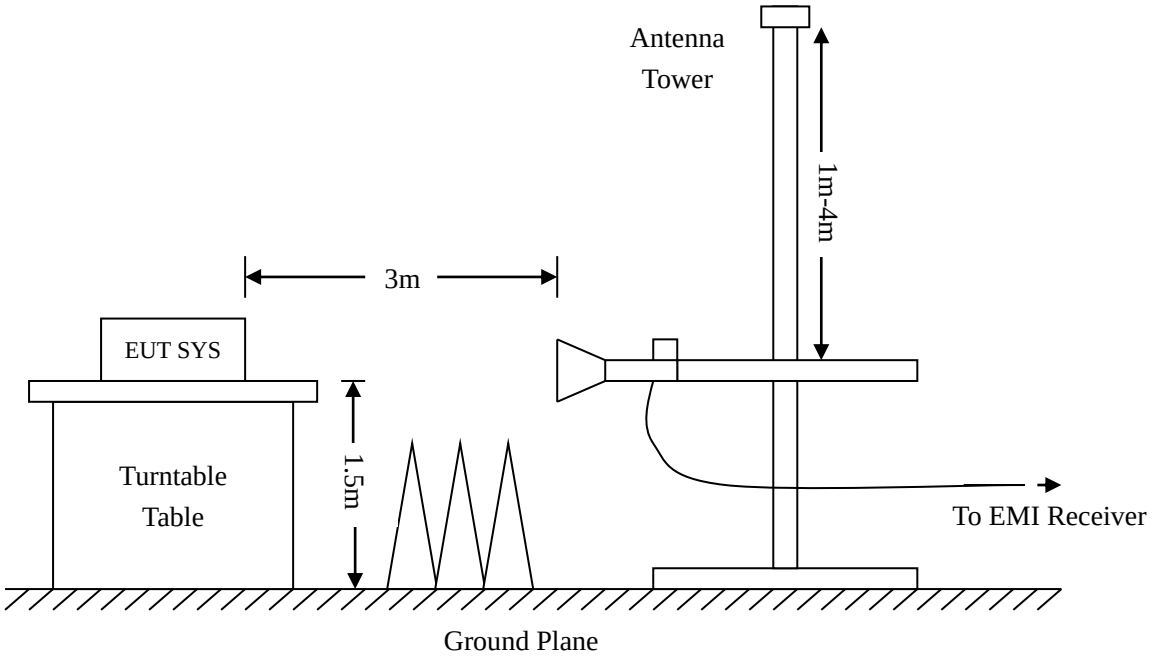
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

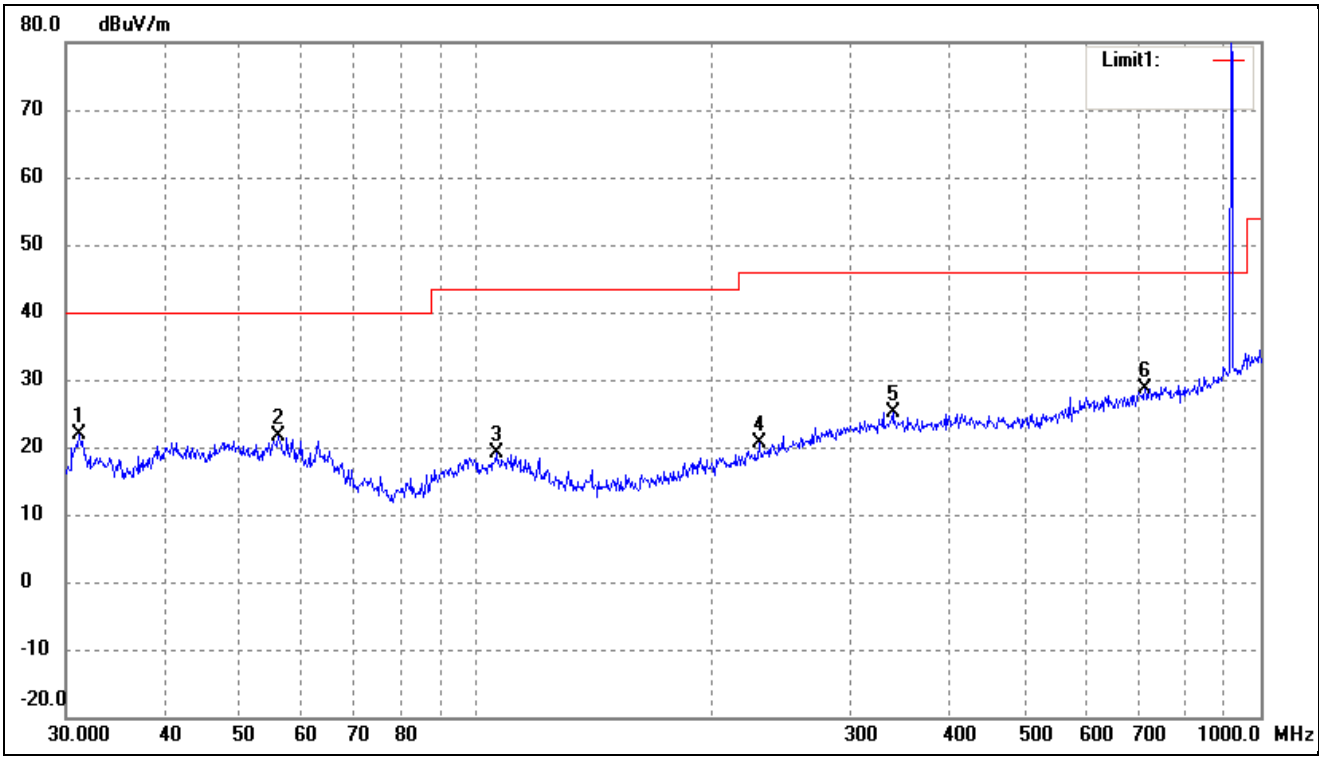
Margin = Corr. Ampl. – FCC Part 15C Limit

4.4 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

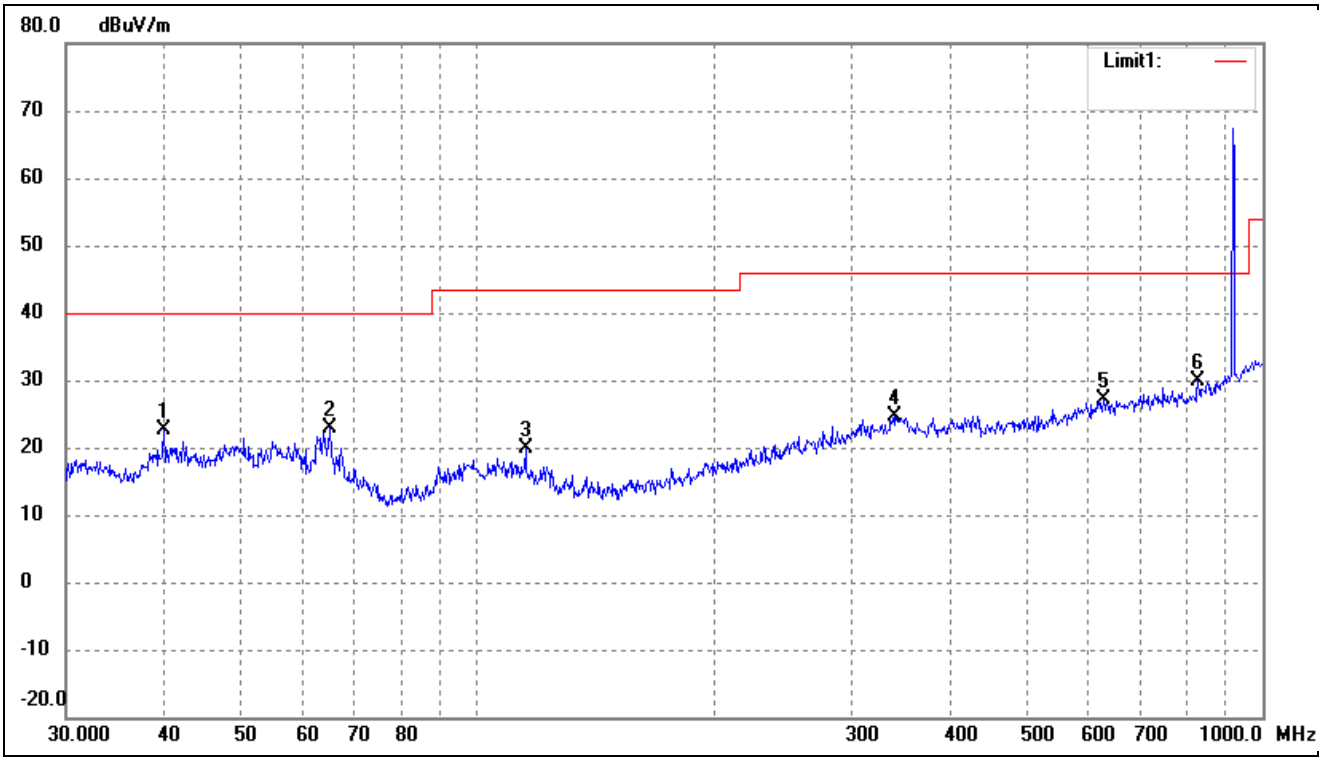
➢ Spurious Emissions Below 1GHz

Test Channel	916MHz	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	31.1798	37.78	-16.00	21.78	40.00	-18.22	356	100	peak
2	56.0007	35.05	-13.45	21.60	40.00	-18.40	94	100	peak
3	106.0126	33.03	-14.01	19.02	43.50	-24.48	323	100	peak
4	229.2931	31.34	-10.82	20.52	46.00	-25.48	110	100	peak
5	339.5888	31.65	-6.53	25.12	46.00	-20.88	135	100	peak
6	711.6734	31.16	-2.43	28.73	46.00	-17.27	346	100	peak

Test Channel	916MHz	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	39.9942	31.10	-8.55	22.55	40.00	-17.45	350	100	peak
2	65.1145	35.09	-12.21	22.88	40.00	-17.12	96	100	peak
3	115.3205	35.12	-15.36	19.76	43.50	-23.74	352	100	peak
4	340.7817	32.61	-8.08	24.53	46.00	-21.47	96	100	peak
5	627.2738	30.76	-3.75	27.01	46.00	-18.99	301	100	peak
6	827.4934	30.76	-0.76	30.00	46.00	-16.00	315	100	peak

Spurious Emissions Above 1GHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
916MHz							
1832.00	67.72	-11.33	56.39	74	-17.61	H	PK
1832.00	51.02	-11.33	39.69	54	-14.31	H	AV
2748.00	61.44	-6.26	55.18	74	-18.82	V	PK
2748.00	47.70	-6.26	41.44	54	-12.56	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz..

5. Out of Band Emissions

5.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 902MHz to 928MHz, than mark the higher-level emission for comparing with the FCC rules.

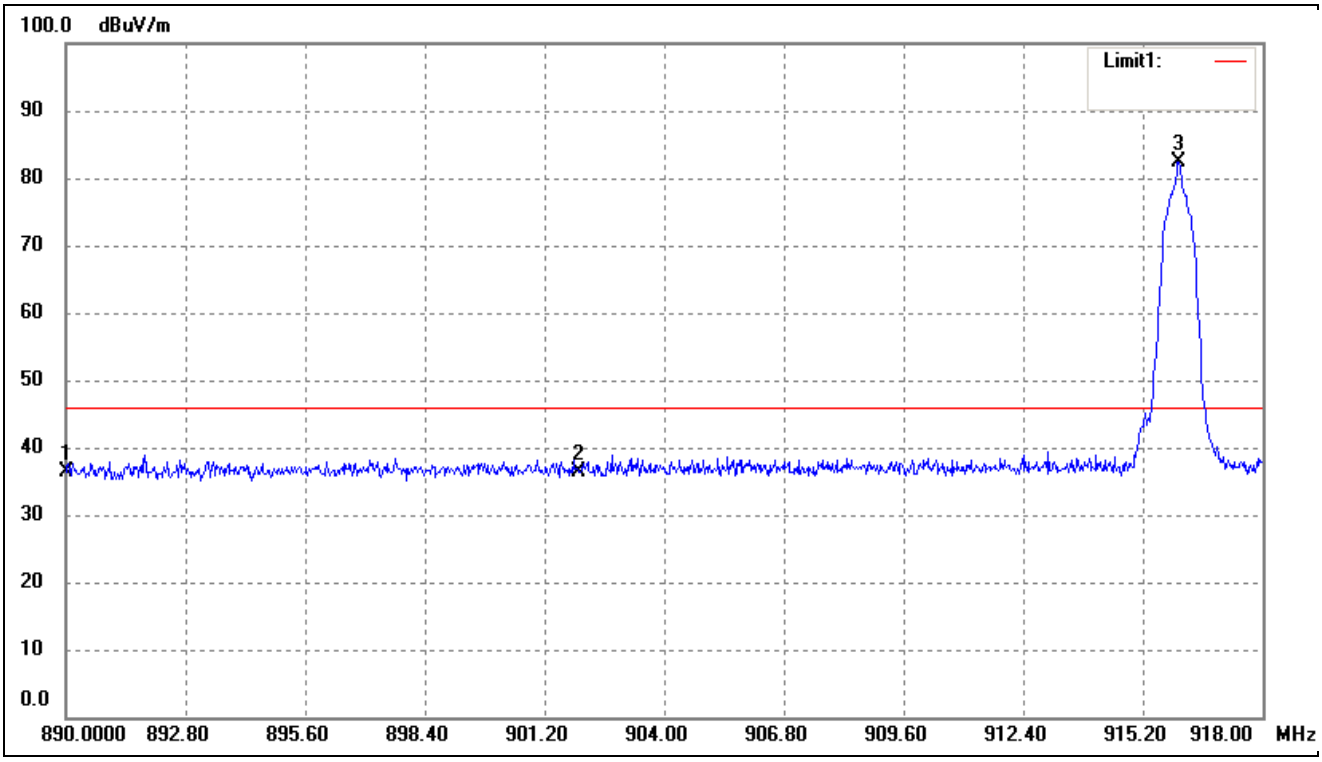
5.3 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	902.00	<46 dBuV	Pass
Highest	928.00	<46 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.249 requirements.

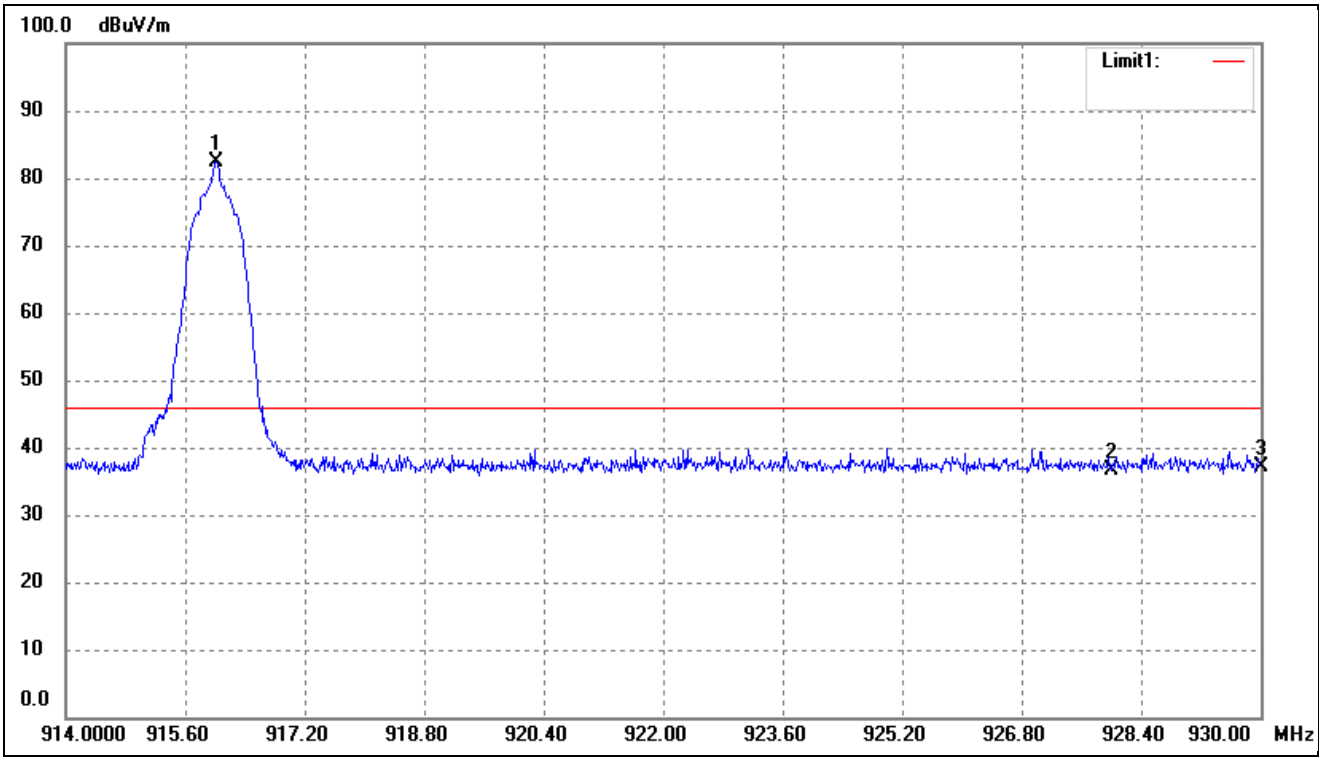
Please refer to the test plots as below.

Test Channel	Low	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	890.0000	35.31	0.98	36.29	46.00	-9.71	114	100	peak
2	902.0000	34.94	1.44	36.38	46.00	-9.62	277	100	peak
3	916.0400	80.56	1.80	82.36	114.00	-31.64	100	100	peak

Test Channel	High	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	916.0160	80.53	1.80	82.33	114.00	-31.67	222	100	peak
2	928.0000	34.73	2.01	36.74	46.00	-9.26	93	100	peak
3	930.0000	35.03	2.04	37.07	46.00	-8.93	249	100	peak

6. Emission Bandwidth

6.1 Standard Applicable

According to 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2 Test Procedure

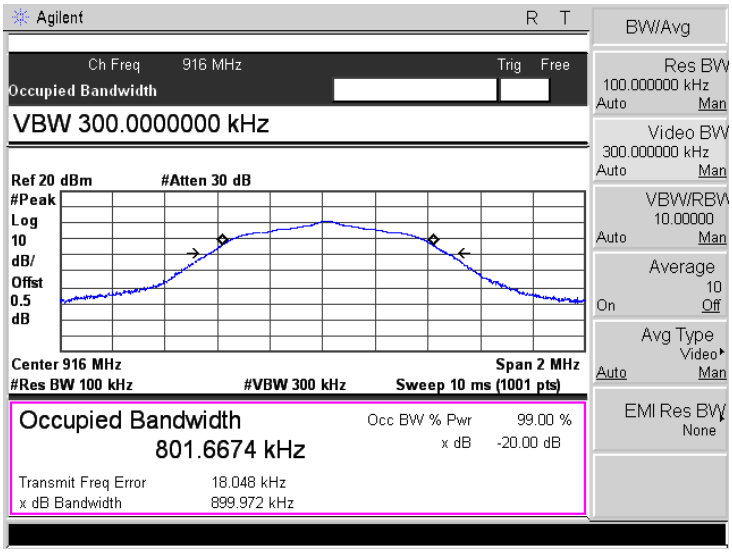
According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Set span = 1MHz, centered on a transmitting channel
RBW ≥1% 20dB Bandwidth, VBW ≥RBW
Sweep = auto
Detector function = peak
Trace = max hold
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

6.3 Summary of Test Results/Plots

Test Channel	20dB Bandwidth(kHz)
916MHz	899.972

Please refer to the following test plots

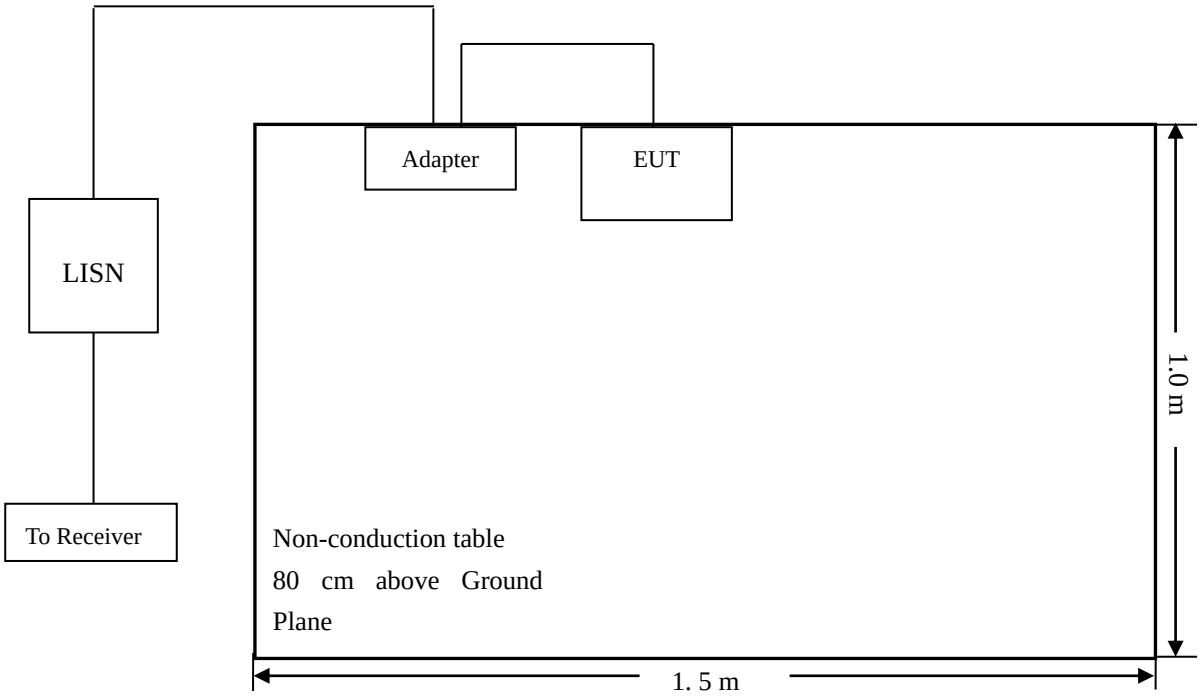
Low Channel	 Agilent R T BW/Avg Ch Freq 916 MHz Trig Free Occupied Bandwidth VBW 300.0000000 kHz Ref 20 dBm #Atten 30 dB #Peak Log 10 dB/ Offst 0.5 dB Center 916 MHz Span 2 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts) Occupied Bandwidth 801.6674 kHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error 18.048 kHz x dB Bandwidth 899.972 kHz Res BW 100.000000 kHz Auto Man Video BW 300.000000 kHz Auto Man VBW/RBW 10.00000 Auto Man Average 10 On Off Avg Type Video Auto Man EMI Res BW None

7. Conducted Emissions

7.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

7.2 Basic Test Setup Block Diagram



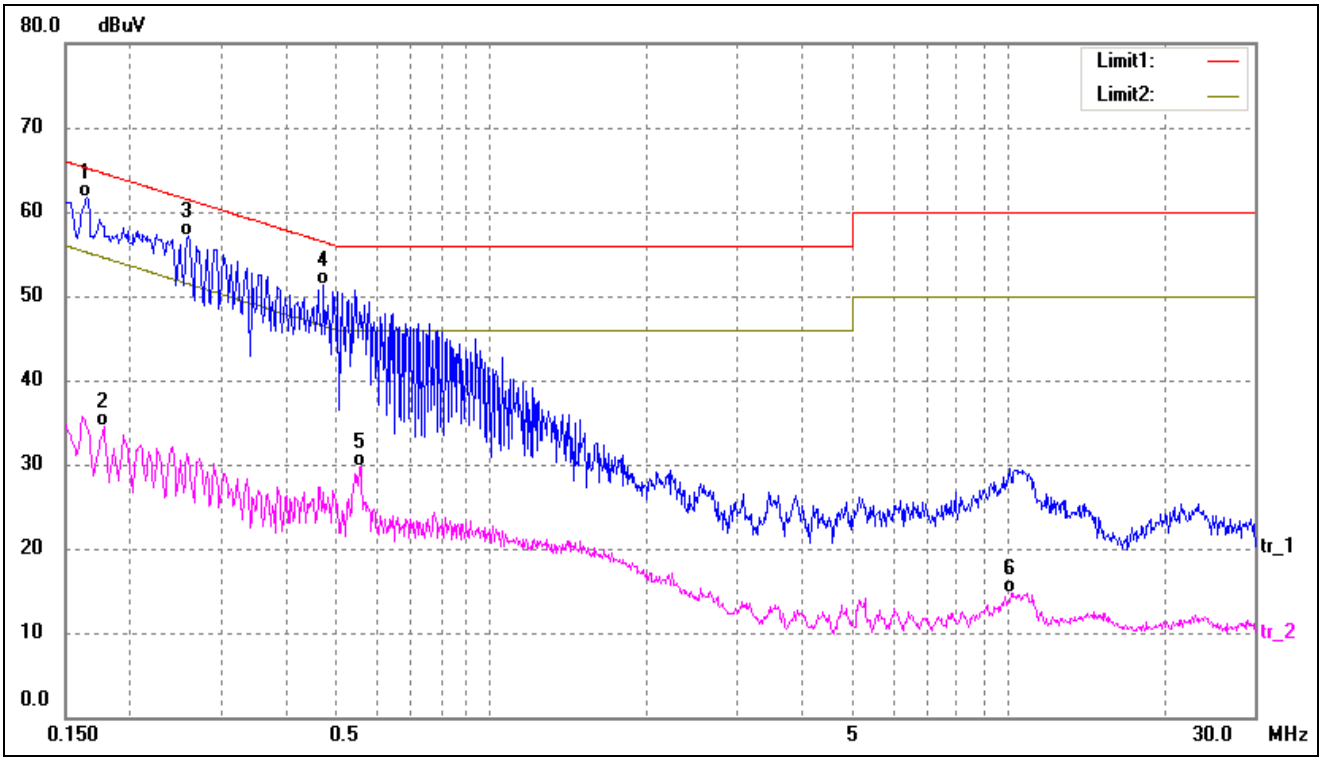
7.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency ..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

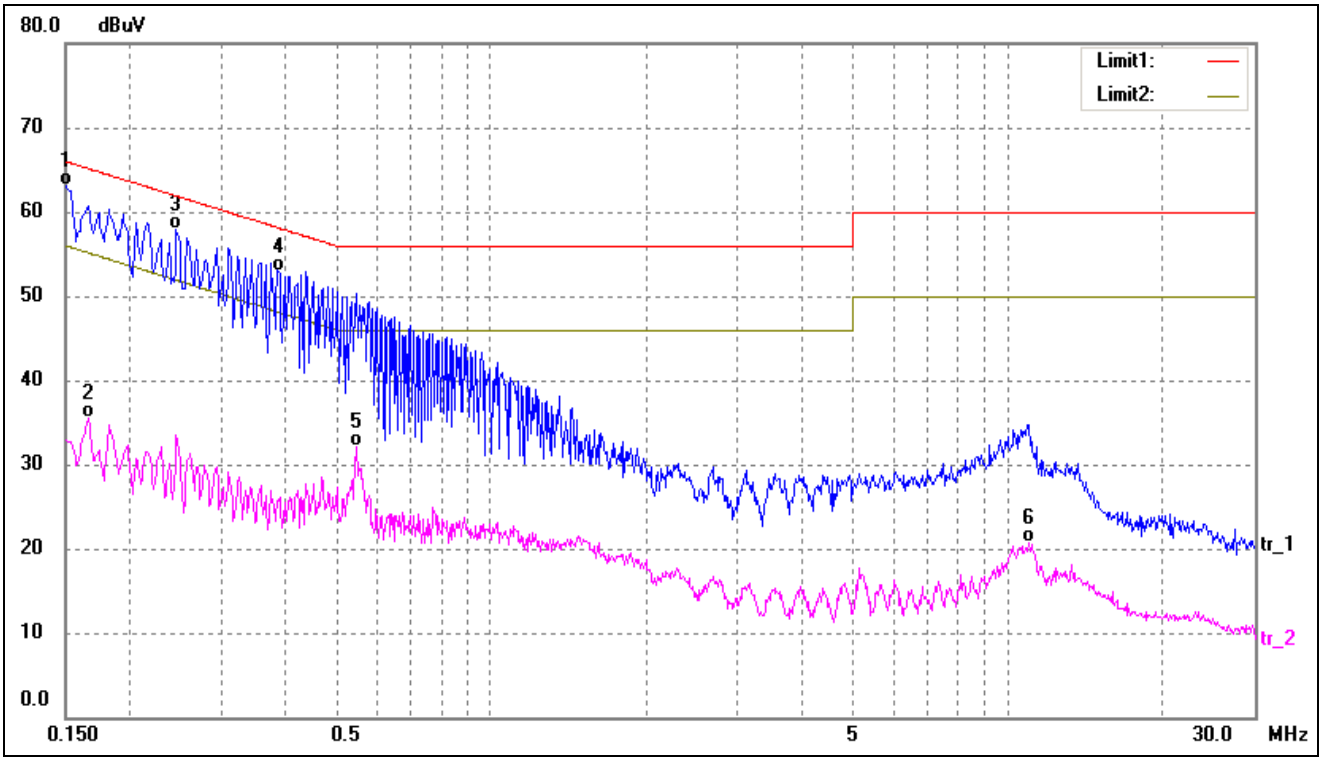
7.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1650	51.51	10.11	61.62	65.21	-3.59	QP
2	0.1780	24.38	10.11	34.49	54.58	-20.09	AVG
3	0.2589	46.97	10.16	57.13	61.47	-4.34	QP
4	0.4740	41.10	10.28	51.38	56.44	-5.06	QP
5	0.5580	19.45	10.32	29.77	46.00	-16.23	AVG
6	10.1660	3.79	10.95	14.74	50.00	-35.26	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1500	53.04	10.10	63.14	66.00	-2.86	QP
2	0.1660	25.48	10.11	35.59	55.16	-19.57	AVG
3	0.2460	47.84	10.15	57.99	61.89	-3.90	QP
4	0.3872	42.72	10.24	52.96	58.12	-5.16	QP
5	0.5500	21.86	10.32	32.18	46.00	-13.82	AVG
6	10.9860	9.73	10.96	20.69	50.00	-29.31	AVG

******* END OF REPORT *******