



UTC Fire and Security

319.5 MHz OEM Transceiver w/Crystal TX

FCC 15.207:2018

FCC 15.231:2018

Low Power Transceiver

Report # UTCF0083.1



NVLAP LAB CODE: 200676-0



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CERTIFICATE OF TEST

Last Date of Test: March 12, 2018
UTC Fire and Security
Model: 319.5 MHz OEM Transceiver w/Crystal TX

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2018	ANSI C63.10:2013
FCC 15.231:2018	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Field Strength of Fundamental	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.9.2	Occupied Bandwidth	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Victor Ratnoff, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY



Revision Number		Description	Date	Page Number
00		None		

ACCREDITATIONS AND AUTHORIZATIONS



United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://portlandcustomer.element.com/ts/scope/scope.htm>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

MEASUREMENT UNCERTAINTY



Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

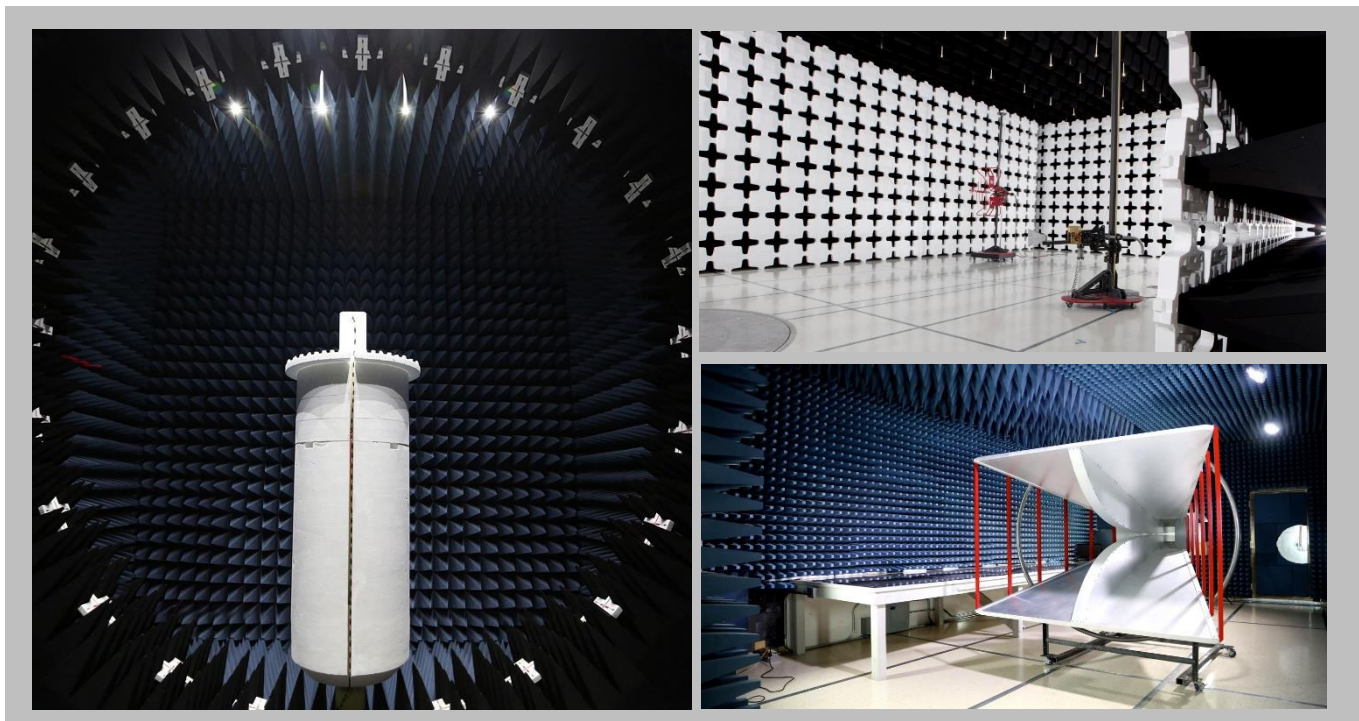
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

FACILITIES

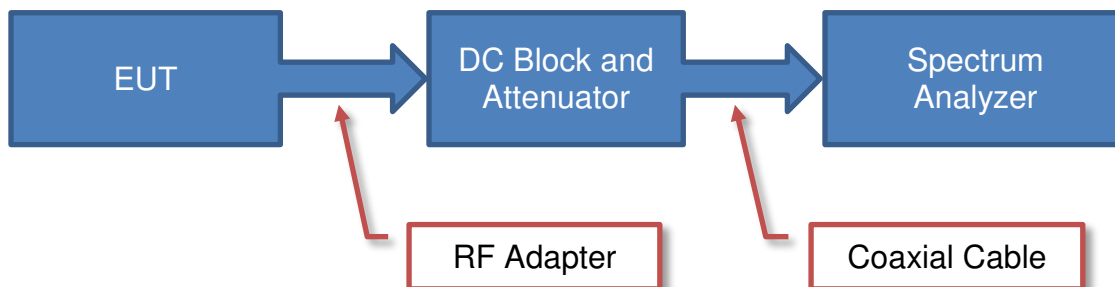


California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157

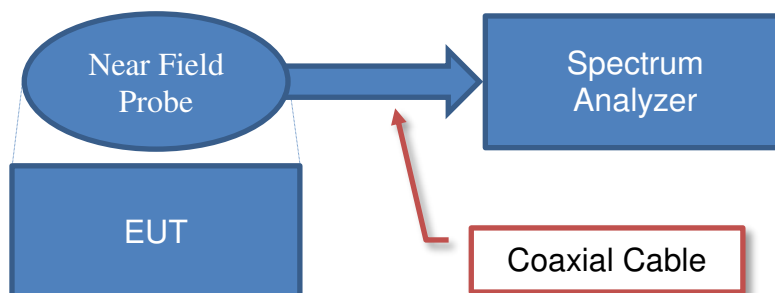


Test Setup Block Diagrams

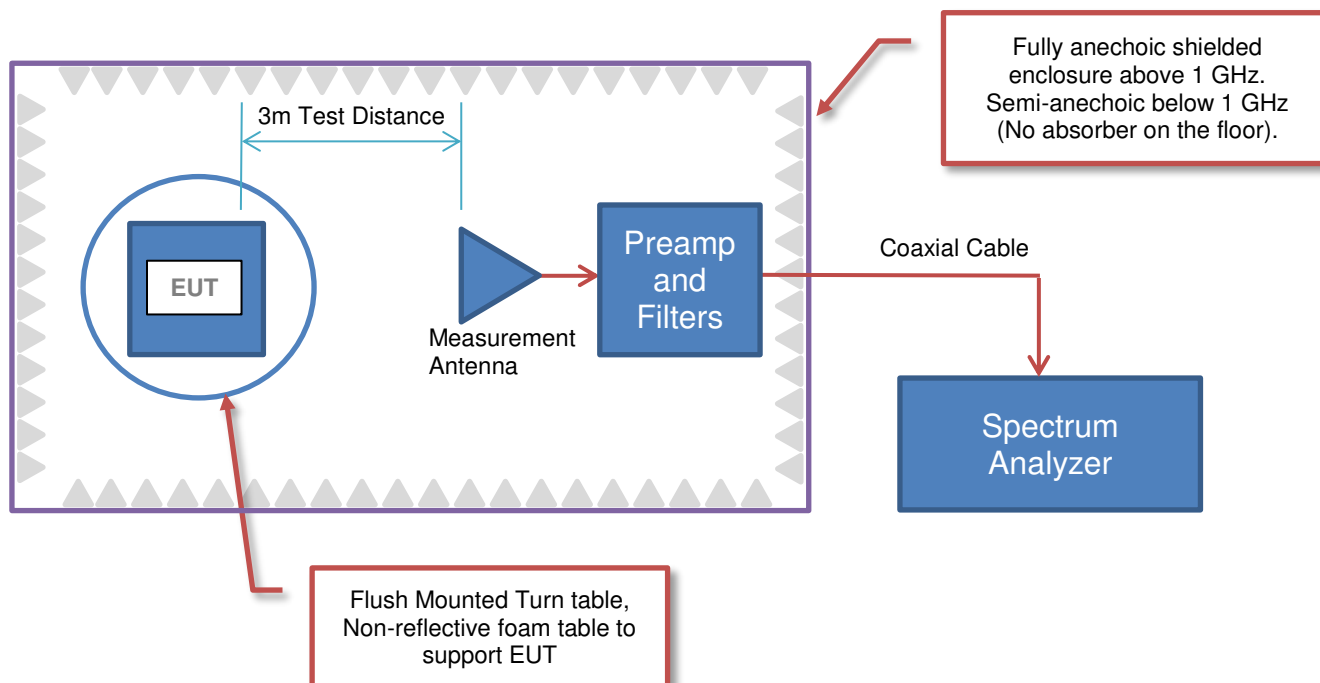
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	UTC Fire and Security
Address:	9 Farm Springs Road
City, State, Zip:	Farmington, CT 06034
Test Requested By:	Konstantin Khrustov
Model:	319.5 MHz OEM Transceiver w/Crystal TX
First Date of Test:	March 9, 2018
Last Date of Test:	March 12, 2018
Receipt Date of Samples:	March 7, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

This device is a Remote Control/Security Device Transceiver operating on a frequency of 319.50 MHz. It receives signals from existing ITI transmitters or other transceivers. It transmits signals to other super board transceivers. A hardwire bus provides a data link to an external board or a security panel. 12VDC power is supplied to the device via either a hardwire bus connection or a Class 2 transformer. The transceiver board has a profile, which is 4.75" long by 3.25" wide.

Testing Objective:

To demonstrate compliance to FCC 15.231 specifications.

CONFIGURATIONS



Configuration UTCF0083- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Power Supply	GE	411205003CT	8213671313
Repeater (TX Unit)	Interlogix	RXTX 9017	502 2024 1091091

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC	No	2m	No	Power Supply	Repeater

Configuration UTCF0083- 3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Power Supply	GE	411205003CT	8213671313
Repeater (CW Unit)	Interlogix	RXTX 9017	502 2024 1091036

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC	No	2m	No	Power Supply	Repeater

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/9/2018	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	3/9/2018	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	3/9/2018	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	3/9/2018	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	3/12/2018	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS



PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Continuously Transmitting Unmodulated at 319.5 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

UTCF0083 - 3

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable - Conducted Cable	Element	OCP, HFP, AWC	OCPA	9-Oct-2017	12 mo
LISN	Solar Electronics	9252-50-24-BNC	LIA	18-Jan-2018	12 mo
Receiver	Rohde & Schwarz	ESCI	ARG	21-Jun-2017	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	BW (kHz)
0.15 - 30.0	1.0
30.0 - 400.0	10.0
400.0 - 1000.0	100.0
1000.0 - 6000.0	1000.0

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

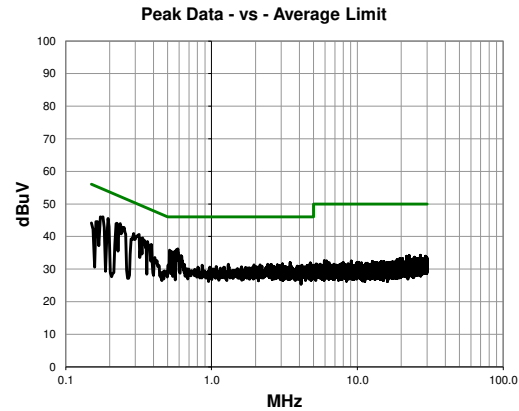
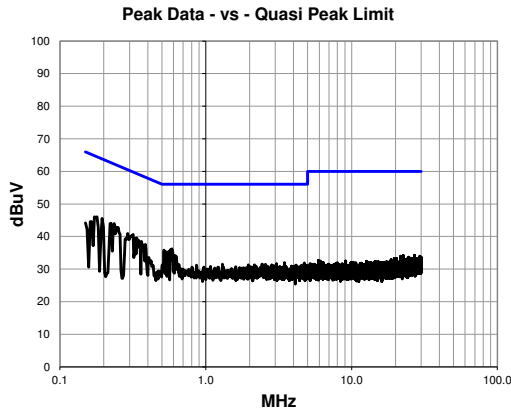
TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

POWERLINE CONDUCTED EMISSIONS



Work Order:	UTCFO083	Date:	12-Mar-2018				
Project:	None	Temperature:	21.5 °C				
Job Site:	OC06	Humidity:	50.8% RH				
Serial Number:	502 2024 1091036	Barometric Pres.:	1021 mbar				
Tested by: Johnny Candelas							
EUT:	319.5 MHz OEM Transceiver w/Crystal TX						
Configuration:	3						
Customer:	UTC Fire and Security						
Attendees:	None						
EUT Power:	110VAC/60Hz						
Operating Mode:	Continuously Transmitting Unmodulated at 319.5 MHz						
Deviations:	None						
Comments:	None						
Test Specifications			Test Method				
FCC 15.207:2018			ANSI C63.10:2013				
Run #	3	Line:	High Line	Ext. Attenuation:	0	Results	Pass



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.236	23.9	20.1	44.0	62.2	-18.2
0.195	25.3	20.2	45.5	63.8	-18.3
0.225	24.0	20.1	44.1	62.6	-18.5
0.172	25.7	20.3	46.0	64.8	-18.8
0.292	20.8	20.1	40.9	60.5	-19.6
0.337	19.4	20.1	39.5	59.3	-19.8
0.587	16.2	20.0	36.2	56.0	-19.8
0.329	19.3	20.1	39.4	59.5	-20.1
0.572	15.9	20.0	35.9	56.0	-20.1
0.363	18.4	20.1	38.5	58.7	-20.2
0.516	15.8	20.0	35.8	56.0	-20.2
0.385	17.6	20.0	37.6	58.2	-20.6
0.531	15.4	20.0	35.4	56.0	-20.6
0.557	15.4	20.0	35.4	56.0	-20.6
0.161	24.3	20.3	44.6	65.4	-20.8
0.150	23.9	20.3	44.2	66.0	-21.8
0.616	14.1	20.0	34.1	56.0	-21.9
3.459	11.7	20.3	32.0	56.0	-24.0
0.407	13.6	20.0	33.6	57.7	-24.1
4.754	11.6	20.3	31.9	56.0	-24.1
3.060	11.3	20.3	31.6	56.0	-24.4
1.303	11.4	20.1	31.5	56.0	-24.5
2.433	11.3	20.2	31.5	56.0	-24.5
2.568	11.1	20.3	31.4	56.0	-24.6
1.956	11.1	20.2	31.3	56.0	-24.7
2.153	11.1	20.2	31.3	56.0	-24.7
2.541	11.0	20.3	31.3	56.0	-24.7
2.829	11.0	20.3	31.3	56.0	-24.7
0.863	11.2	20.0	31.2	56.0	-24.8

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.236	23.9	20.1	44.0	52.2	-8.2
0.195	25.3	20.2	45.5	53.8	-8.3
0.225	24.0	20.1	44.1	52.6	-8.5
0.172	25.7	20.3	46.0	54.8	-8.8
0.292	20.8	20.1	40.9	50.5	-9.6
0.337	19.4	20.1	39.5	49.3	-9.8
0.587	16.2	20.0	36.2	46.0	-9.8
0.329	19.3	20.1	39.4	49.5	-10.1
0.572	15.9	20.0	35.9	46.0	-10.1
0.363	18.4	20.1	38.5	48.7	-10.2
0.516	15.8	20.0	35.8	46.0	-10.2
0.385	17.6	20.0	37.6	48.2	-10.6
0.531	15.4	20.0	35.4	46.0	-10.6
0.557	15.4	20.0	35.4	46.0	-10.6
0.161	24.3	20.3	44.6	55.4	-10.8
0.150	23.9	20.3	44.2	56.0	-11.8
0.616	14.1	20.0	34.1	46.0	-11.9
3.459	11.7	20.3	32.0	46.0	-14.0
0.407	13.6	20.0	33.6	47.7	-14.1
4.754	11.6	20.3	31.9	46.0	-14.1
3.060	11.3	20.3	31.6	46.0	-14.4
1.303	11.4	20.1	31.5	46.0	-14.5
2.433	11.3	20.2	31.5	46.0	-14.5
2.568	11.1	20.3	31.4	46.0	-14.6
1.956	11.1	20.2	31.3	46.0	-14.7
2.153	11.1	20.2	31.3	46.0	-14.7
2.541	11.0	20.3	31.3	46.0	-14.7
2.829	11.0	20.3	31.3	46.0	-14.7
0.863	11.2	20.0	31.2	46.0	-14.8

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
19.651	10.2	21.2	31.4	60.0	-28.6
19.934	10.2	21.2	31.4	60.0	-28.6
5.261	11.0	20.3	31.3	60.0	-28.7
7.522	10.8	20.5	31.3	60.0	-28.7
7.671	10.8	20.5	31.3	60.0	-28.7
8.276	10.8	20.5	31.3	60.0	-28.7
10.130	10.7	20.6	31.3	60.0	-28.7
10.443	10.7	20.6	31.3	60.0	-28.7
11.350	10.6	20.7	31.3	60.0	-28.7
12.275	10.6	20.7	31.3	60.0	-28.7
12.894	10.6	20.7	31.3	60.0	-28.7
13.465	10.6	20.7	31.3	60.0	-28.7
15.692	10.4	20.9	31.3	60.0	-28.7
17.338	10.3	21.0	31.3	60.0	-28.7
5.806	10.9	20.3	31.2	60.0	-28.8
6.686	10.8	20.4	31.2	60.0	-28.8
7.063	10.7	20.5	31.2	60.0	-28.8
7.194	10.7	20.5	31.2	60.0	-28.8
8.089	10.7	20.5	31.2	60.0	-28.8
9.634	10.6	20.6	31.2	60.0	-28.8
11.178	10.6	20.6	31.2	60.0	-28.8
11.995	10.5	20.7	31.2	60.0	-28.8
12.126	10.5	20.7	31.2	60.0	-28.8
12.555	10.5	20.7	31.2	60.0	-28.8
16.454	10.2	21.0	31.2	60.0	-28.8
21.971	9.9	21.3	31.2	60.0	-28.8
24.102	9.6	21.6	31.2	60.0	-28.8
6.048	10.7	20.4	31.1	60.0	-28.9
6.731	10.7	20.4	31.1	60.0	-28.9
8.332	10.6	20.5	31.1	60.0	-28.9
8.388	10.6	20.5	31.1	60.0	-28.9
8.414	10.6	20.5	31.1	60.0	-28.9
8.537	10.6	20.5	31.1	60.0	-28.9
8.843	10.6	20.5	31.1	60.0	-28.9
9.246	10.6	20.5	31.1	60.0	-28.9
9.317	10.6	20.5	31.1	60.0	-28.9
10.484	10.5	20.6	31.1	60.0	-28.9
13.517	10.4	20.7	31.1	60.0	-28.9
15.786	10.2	20.9	31.1	60.0	-28.9
18.061	10.1	21.0	31.1	60.0	-28.9
20.673	9.8	21.3	31.1	60.0	-28.9
5.160	10.7	20.3	31.0	60.0	-29.0
5.690	10.7	20.3	31.0	60.0	-29.0
6.030	10.6	20.4	31.0	60.0	-29.0
7.895	10.5	20.5	31.0	60.0	-29.0
9.488	10.4	20.6	31.0	60.0	-29.0
11.544	10.3	20.7	31.0	60.0	-29.0
12.458	10.3	20.7	31.0	60.0	-29.0
13.267	10.3	20.7	31.0	60.0	-29.0
15.062	10.2	20.8	31.0	60.0	-29.0
16.069	10.1	20.9	31.0	60.0	-29.0
16.222	10.1	20.9	31.0	60.0	-29.0
18.804	9.8	21.2	31.0	60.0	-29.0
5.522	10.6	20.3	30.9	60.0	-29.1
7.313	10.4	20.5	30.9	60.0	-29.1
7.731	10.4	20.5	30.9	60.0	-29.1
9.742	10.3	20.6	30.9	60.0	-29.1
9.768	10.3	20.6	30.9	60.0	-29.1
10.096	10.3	20.6	30.9	60.0	-29.1
10.204	10.3	20.6	30.9	60.0	-29.1
10.704	10.3	20.6	30.9	60.0	-29.1
11.242	10.3	20.6	30.9	60.0	-29.1
12.514	10.2	20.7	30.9	60.0	-29.1
17.591	9.9	21.0	30.9	60.0	-29.1
5.474	10.5	20.3	30.8	60.0	-29.2
6.220	10.4	20.4	30.8	60.0	-29.2
6.783	10.4	20.4	30.8	60.0	-29.2
6.977	10.4	20.4	30.8	60.0	-29.2
7.030	10.3	20.5	30.8	60.0	-29.2
7.955	10.3	20.5	30.8	60.0	-29.2
8.932	10.3	20.5	30.8	60.0	-29.2
9.981	10.2	20.6	30.8	60.0	-29.2
11.074	10.2	20.6	30.8	60.0	-29.2
13.379	10.1	20.7	30.8	60.0	-29.2
13.663	10.1	20.7	30.8	60.0	-29.2
13.704	10.1	20.7	30.8	60.0	-29.2
14.681	10.0	20.8	30.8	60.0	-29.2
14.969	10.0	20.8	30.8	60.0	-29.2
18.151	9.8	21.0	30.8	60.0	-29.2
10.503	10.1	20.6	30.7	60.0	-29.3
11.600	10.0	20.7	30.7	60.0	-29.3
13.200	9.9	20.7	30.6	60.0	-29.4
10.973	9.9	20.6	30.5	60.0	-29.5
8.492	9.9	20.5	30.4	60.0	-29.6
8.738	9.9	20.5	30.4	60.0	-29.6
8.809	9.9	20.5	30.4	60.0	-29.6
5.847	9.8	20.4	30.2	60.0	-29.8
10.824	9.3	20.6	29.9	60.0	-30.1

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
19.651	10.2	21.2	31.4	50.0	-18.6
19.934	10.2	21.2	31.4	50.0	-18.6
5.261	11.0	20.3	31.3	50.0	-18.7
7.522	10.8	20.5	31.3	50.0	-18.7
7.671	10.8	20.5	31.3	50.0	-18.7
8.276	10.8	20.5	31.3	50.0	-18.7
10.130	10.7	20.6	31.3	50.0	-18.7
10.443	10.7	20.6	31.3	50.0	-18.7
11.350	10.6	20.7	31.3	50.0	-18.7
12.275	10.6	20.7	31.3	50.0	-18.7
12.894	10.6	20.7	31.3	50.0	-18.7
13.465	10.6	20.7	31.3	50.0	-18.7
15.692	10.4	20.9	31.3	50.0	-18.7
17.338	10.3	21.0	31.3	50.0	-18.7
5.806	10.9	20.3	31.2	50.0	-18.8
6.686	10.8	20.4	31.2	50.0	-18.8
7.063	10.7	20.5	31.2	50.0	-18.8
7.194	10.7	20.5	31.2	50.0	-18.8
8.089	10.7	20.5	31.2	50.0	-18.8
9.634	10.6	20.6	31.2	50.0	-18.8
11.178	10.6	20.6	31.2	50.0	-18.8
11.995	10.5	20.7	31.2	50.0	-18.8
12.126	10.5	20.7	31.2	50.0	-18.8
12.555	10.5	20.7	31.2	50.0	-18.8
16.454	10.2	21.0	31.2	50.0	-18.8
21.971	9.9	21.3	31.2	50.0	-18.8
24.102	9.6	21.6	31.2	50.0	-18.8
6.048	10.7	20.4	31.1	50.0	-18.9
6.731	10.7	20.4	31.1	50.0	-18.9
8.332	10.6	20.5	31.1	50.0	-18.9
8.388	10.6	20.5	31.1	50.0	-18.9
8.414	10.6	20.5	31.1	50.0	-18.9
8.537	10.6	20.5	31.1	50.0	-18.9
8.843	10.6	20.5	31.1	50.0	-18.9
9.246	10.6	20.5	31.1	50.0	-18.9
9.317	10.6	20.5	31.1	50.0	-18.9
10.484	10.5	20.6	31.1	50.0	-18.9
13.517	10.4	20.7	31.1	50.0	-18.9
15.786	10.2	20.9	31.1	50.0	-18.9
18.061	10.1	21.0	31.1	50.0	-18.9
20.673	9.8	21.3	31.1	50.0	-18.9
5.160	10.7	20.3	31.0	50.0	-19.0
5.690	10.7	20.3	31.0	50.0	-19.0
6.030	10.6	20.4	31.0	50.0	-19.0
7.895	10.5	20.5	31.0	50.0	-19.0
9.488	10.4	20.6	31.0	50.0	-19.0
11.544	10.3	20.7	31.0	50.0	-19.0
12.458	10.3	20.7	31.0	50.0	-19.0
13.267	10.3	20.7	31.0	50.0	-19.0
15.062	10.2	20.8	31.0	50.0	-19.0
16.069	10.1	20.9	31.0	50.0	-19.0
16.222	10.1	20.9	31.0	50.0	-19.0
18.804	9.8	21.2	31.0	50.0	-19.0
5.522	10.6	20.3	30.9	50.0	-19.1
7.313	10.4	20.5	30.9	50.0	-19.1
7.731	10.4	20.5	30.9	50.0	-19.1
9.742	10.3	20.6	30.9	50.0	-19.1
9.768	10.3	20.6	30.9	50.0	-19.1
10.096	10.3	20.6	30.9	50.0	-19.1
10.204	10.3	20.6	30.9	50.0	-19.1
10.704	10.3	20.6	30.9	50.0	-19.1
11.242	10.3	20.6	30.9	50.0	-19.1
12.514	10.2	20.7	30.9	50.0	-19.1
17.591	9.9	21.0	30.9	50.0	-19.1
5.474	10.5	20.3	30.8	50.0	-19.2
6.220	10.4	20.4	30.8	50.0	-19.2
6.783	10.4	20.4	30.8	50.0	-19.2
6.977	10.4	20.4	30.8	50.0	-19.2
7.030	10.3	20.5	30.8	50.0	-19.2
7.955	10.3	20.5	30.8	50.0	-19.2
8.932	10.3	20.5	30.8	50.0	-19.2
9.981	10.2	20.6	30.8	50.0	-19.2
11.074	10.2	20.6	30.8	50.0	-19.2
13.379	10.1	20.7	30.8	50.0	-19.2
13.663	10.1	20.7	30.8	50.0	-19.2
13.704	10.1	20.7	30.8	50.0	-19.2
14.681	10.0	20.8	30.8	50.0	-19.2
14.969	10.0	20.8	30.8	50.0	-19.2
18.151	9.8	21.0	30.8	50.0	-19.2
10.503	10.1	20.6	30.7	50.0	-19.3
11.600	10.0	20.7	30.7	50.0	-19.3
13.200	9.9	20.7	30.6	50.0	-19.4
10.973	9.9	20.6	30.5	50.0	-19.5
8.492	9.9	20.5	30.4	50.0	-19.6
8.738	9.9	20.5	30.4	50.0	-19.6
8.809	9.9	20.5	30.4	50.0	-19.6
5.847	9.8	20.4	30.2	50.0	-19.8
10.824	9.3	20.6	29.9	50.0	-20.1

POWERLINE CONDUCTED EMISSIONS



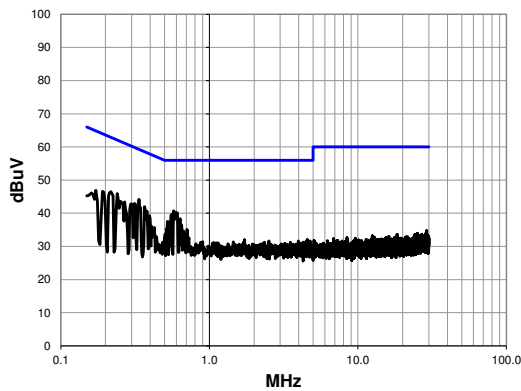
EmiRS 2018.02.06

PSA-ESCI 2017.12.19

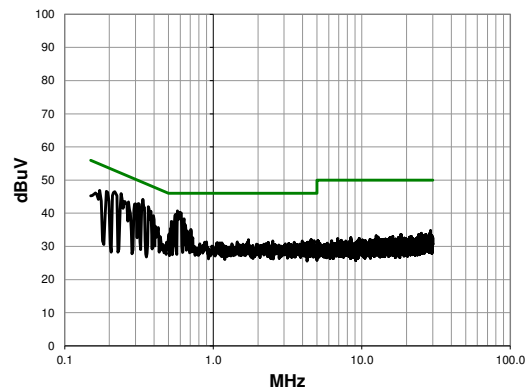
Work Order:	UTCF0083	Date:	12-Mar-2018	
Project:	None	Temperature:	21.5 °C	
Job Site:	OC06	Humidity:	50.8% RH	
Serial Number:	502 2024 1091036	Barometric Pres.:	1021 mbar	
EUT:	319.5 MHz OEM Transceiver w/Crystal TX			Tested by: Johnny Candelas
Configuration:	3			
Customer:	UTC Fire and Security			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Continuously Transmitting Unmodulated at 319.5 MHz			
Deviations:	None			
Comments:	None			
Test Specifications		Test Method		
FCC 15.207:2018		ANSI C63.10:2013		

Run #	4	Line:	Neutral	Ext. Attenuation:	0	Results	Pass
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Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.337	24.1	20.1	44.2	59.3	-15.1
0.575	20.7	20.0	40.7	56.0	-15.3
0.240	25.8	20.1	45.9	62.1	-16.2
0.557	19.7	20.0	39.7	56.0	-16.3
0.217	26.4	20.1	46.5	62.9	-16.4
0.366	21.9	20.1	42.0	58.6	-16.6
0.314	22.8	20.1	42.9	59.9	-17.0
0.191	26.4	20.2	46.6	64.0	-17.4
0.299	22.7	20.1	42.8	60.3	-17.5
0.269	23.3	20.1	43.4	61.1	-17.7
0.635	18.3	20.0	38.3	56.0	-17.7
0.172	26.6	20.3	46.9	64.8	-17.9
0.523	17.5	20.0	37.5	56.0	-18.5
0.396	19.3	20.0	39.3	57.9	-18.6
0.650	16.5	20.0	36.5	56.0	-19.5
0.706	15.1	20.0	35.1	56.0	-20.9
0.669	14.6	20.0	34.6	56.0	-21.4
0.407	16.1	20.0	36.1	57.7	-21.6
0.504	13.8	20.0	33.8	56.0	-22.2
0.728	12.6	20.0	32.6	56.0	-23.4
1.724	11.8	20.2	32.0	56.0	-24.0
4.571	11.7	20.3	32.0	56.0	-24.0
0.437	13.0	20.0	33.0	57.1	-24.1
2.512	11.3	20.3	31.6	56.0	-24.4
3.982	11.3	20.3	31.6	56.0	-24.4
4.493	11.3	20.3	31.6	56.0	-24.4
4.765	11.3	20.3	31.6	56.0	-24.4

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.337	24.1	20.1	44.2	49.3	-5.1
0.575	20.7	20.0	40.7	46.0	-5.3
0.240	25.8	20.1	45.9	52.1	-6.2
0.557	19.7	20.0	39.7	46.0	-6.3
0.217	26.4	20.1	46.5	52.9	-6.4
0.366	21.9	20.1	42.0	48.6	-6.6
0.314	22.8	20.1	42.9	49.9	-7.0
0.191	26.4	20.2	46.6	54.0	-7.4
0.299	22.7	20.1	42.8	50.3	-7.5
0.269	23.3	20.1	43.4	51.1	-7.7
0.635	18.3	20.0	38.3	46.0	-7.7
0.172	26.6	20.3	46.9	54.8	-7.9
0.523	17.5	20.0	37.5	46.0	-8.5
0.396	19.3	20.0	39.3	47.9	-8.6
0.650	16.5	20.0	36.5	46.0	-9.5
0.706	15.1	20.0	35.1	46.0	-10.9
0.669	14.6	20.0	34.6	46.0	-11.4
0.407	16.1	20.0	36.1	47.7	-11.6
0.504	13.8	20.0	33.8	46.0	-12.2
0.728	12.6	20.0	32.6	46.0	-13.4
1.724	11.8	20.2	32.0	46.0	-14.0
4.571	11.7	20.3	32.0	46.0	-14.0
0.437	13.0	20.0	33.0	47.1	-14.1
2.512	11.3	20.3	31.6	46.0	-14.4
3.982	11.3	20.3	31.6	46.0	-14.4
4.493	11.3	20.3	31.6	46.0	-14.4
4.765	11.3	20.3	31.6	46.0	-14.4

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.900	11.4	20.0	31.4	56.0	-24.6
1.448	11.3	20.1	31.4	56.0	-24.6
1.698	11.2	20.2	31.4	56.0	-24.6
3.504	11.0	20.3	31.3	56.0	-24.7
4.299	11.0	20.3	31.3	56.0	-24.7
4.541	11.0	20.3	31.3	56.0	-24.7
1.068	11.1	20.1	31.2	56.0	-24.8
2.347	11.0	20.2	31.2	56.0	-24.8
4.634	10.9	20.3	31.2	56.0	-24.8
1.146	11.0	20.1	31.1	56.0	-24.9
1.053	10.9	20.1	31.0	56.0	-25.0
4.134	10.7	20.3	31.0	56.0	-25.0
2.273	10.7	20.2	30.9	56.0	-25.1
3.224	10.6	20.3	30.9	56.0	-25.1
1.336	10.7	20.1	30.8	56.0	-25.2
3.060	10.5	20.3	30.8	56.0	-25.2
29.004	12.5	22.2	34.7	60.0	-25.3
1.586	10.6	20.1	30.7	56.0	-25.3
1.956	10.5	20.2	30.7	56.0	-25.3
2.187	10.5	20.2	30.7	56.0	-25.3
3.832	10.4	20.3	30.7	56.0	-25.3
4.079	10.4	20.3	30.7	56.0	-25.3
4.202	10.4	20.3	30.7	56.0	-25.3
3.344	10.3	20.3	30.6	56.0	-25.4
3.653	10.3	20.3	30.6	56.0	-25.4
4.015	10.3	20.3	30.6	56.0	-25.4
2.601	10.2	20.3	30.5	56.0	-25.5
1.519	10.3	20.1	30.4	56.0	-25.6
1.180	10.2	20.1	30.3	56.0	-25.7
1.848	10.1	20.2	30.3	56.0	-25.7
28.829	12.2	22.1	34.3	60.0	-25.7
4.235	9.9	20.3	30.2	56.0	-25.8
1.202	9.9	20.1	30.0	56.0	-26.0
25.176	12.3	21.7	34.0	60.0	-26.0
4.948	9.5	20.3	29.8	56.0	-26.2
28.441	11.7	22.1	33.8	60.0	-26.2
18.285	12.6	21.0	33.6	60.0	-26.4
24.154	12.0	21.6	33.6	60.0	-26.4
26.892	11.7	21.9	33.6	60.0	-26.4
29.187	11.5	22.1	33.6	60.0	-26.4
18.468	12.3	21.2	33.5	60.0	-26.5
28.918	11.4	22.1	33.5	60.0	-26.5
26.515	11.5	21.9	33.4	60.0	-26.6
29.444	11.3	22.1	33.4	60.0	-26.6
29.060	11.2	22.1	33.3	60.0	-26.7
12.473	12.5	20.7	33.2	60.0	-26.8
26.228	11.3	21.9	33.2	60.0	-26.8
28.202	11.1	22.1	33.2	60.0	-26.8
27.224	11.1	22.0	33.1	60.0	-26.9
27.661	11.0	22.1	33.1	60.0	-26.9
29.265	11.0	22.1	33.1	60.0	-26.9
29.709	11.0	22.1	33.1	60.0	-26.9
16.136	12.1	20.9	33.0	60.0	-27.0
21.505	11.7	21.3	33.0	60.0	-27.0
24.971	11.3	21.7	33.0	60.0	-27.0
26.657	11.1	21.9	33.0	60.0	-27.0
24.840	11.2	21.7	32.9	60.0	-27.1
27.892	10.8	22.1	32.9	60.0	-27.1
28.273	10.8	22.1	32.9	60.0	-27.1
12.883	12.1	20.7	32.8	60.0	-27.2
20.893	11.5	21.3	32.8	60.0	-27.2
21.192	11.5	21.3	32.8	60.0	-27.2
25.344	11.1	21.7	32.8	60.0	-27.2
27.512	10.7	22.1	32.8	60.0	-27.2
28.097	10.7	22.1	32.8	60.0	-27.2
17.677	11.7	21.0	32.7	60.0	-27.3
26.116	10.9	21.8	32.7	60.0	-27.3
27.000	10.8	21.9	32.7	60.0	-27.3
8.436	12.1	20.5	32.6	60.0	-27.4
15.457	11.7	20.9	32.6	60.0	-27.4
15.547	11.7	20.9	32.6	60.0	-27.4
18.028	11.6	21.0	32.6	60.0	-27.4
21.266	11.3	21.3	32.6	60.0	-27.4
23.542	11.1	21.5	32.6	60.0	-27.4
24.952	10.9	21.7	32.6	60.0	-27.4
26.754	10.7	21.9	32.6	60.0	-27.4
27.340	10.6	22.0	32.6	60.0	-27.4
28.150	10.5	22.1	32.6	60.0	-27.4
29.981	10.5	22.1	32.6	60.0	-27.4
15.939	11.6	20.9	32.5	60.0	-27.5
19.285	11.3	21.2	32.5	60.0	-27.5
25.721	10.7	21.8	32.5	60.0	-27.5
27.433	10.5	22.0	32.5	60.0	-27.5
27.687	10.4	22.1	32.5	60.0	-27.5
6.873	12.0	20.4	32.4	60.0	-27.6
9.593	11.8	20.6	32.4	60.0	-27.6
15.327	11.5	20.9	32.4	60.0	-27.6
15.864	11.5	20.9	32.4	60.0	-27.6
19.852	11.2	21.2	32.4	60.0	-27.6
21.658	11.1	21.3	32.4	60.0	-27.6
22.091	11.1	21.3	32.4	60.0	-27.6
23.867	10.9	21.5	32.4	60.0	-27.6
24.102	10.8	21.6	32.4	60.0	-27.6
26.441	10.5	21.9	32.4	60.0	-27.6
26.930	10.5	21.9	32.4	60.0	-27.6
29.493	10.3	22.1	32.4	60.0	-27.6
29.582	10.3	22.1	32.4	60.0	-27.6

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.900	11.4	20.0	31.4	46.0	-14.6
1.448	11.3	20.1	31.4	46.0	-14.6
1.698	11.2	20.2	31.4	46.0	-14.6
3.504	11.0	20.3	31.3	46.0	-14.7
4.299	11.0	20.3	31.3	46.0	-14.7
4.541	11.0	20.3	31.3	46.0	-14.7
1.068	11.1	20.1	31.2	46.0	-14.8
2.347	11.0	20.2	31.2	46.0	-14.8
4.634	10.9	20.3	31.2	46.0	-14.8
1.146	11.0	20.1	31.1	46.0	-14.9
1.053	10.9	20.1	31.0	46.0	-15.0
4.134	10.7	20.3	31.0	46.0	-15.0
2.273	10.7	20.2	30.9	46.0	-15.1
3.224	10.6	20.3	30.9	46.0	-15.1
1.336	10.7	20.1	30.8	46.0	-15.2
3.060	10.5	20.3	30.8	46.0	-15.2
29.004	12.5	22.2	34.7	50.0	-15.3
1.586	10.6	20.1	30.7	46.0	-15.3
1.956	10.5	20.2	30.7	46.0	-15.3
2.187	10.5	20.2	30.7	46.0	-15.3
3.832	10.4	20.3	30.7	46.0	-15.3
4.079	10.4	20.3	30.7	46.0	-15.3
4.202	10.4	20.3	30.7	46.0	-15.3
3.344	10.3	20.3	30.6	46.0	-15.4
3.653	10.3	20.3	30.6	46.0	-15.4
4.015	10.3	20.3	30.6	46.0	-15.4
2.601	10.2	20.3	30.5	46.0	-15.5
1.519	10.3	20.1	30.4	46.0	-15.6
1.180	10.2	20.1	30.3	46.0	-15.7
1.848	10.1	20.2	30.3	46.0	-15.7
28.829	12.2	22.1	34.3	50.0	-15.7
4.235	9.9	20.3	30.2	46.0	-15.8
1.202	9.9	20.1	30.0	46.0	-16.0
25.176	12.3	21.7	34.0	50.0	-16.0
4.948	9.5	20.3	29.8	46.0	-16.2
28.441	11.7	22.1	33.8	50.0	-16.2
18.285	12.6	21.0	33.6	50.0	-16.4
24.154	12.0	21.6	33.6	50.0	-16.4
26.892	11.7	21.9	33.6	50.0	-16.4
29.187	11.5	22.1	33.6	50.0	-16.4
18.468	12.3	21.2	33.5	50.0	-16.5
28.918	11.4	22.1	33.5	50.0	-16.5
26.515	11.5	21.9	33.4	50.0	-16.6
29.444	11.3	22.1	33.4	50.0	-16.6
29.060	11.2	22.1	33.3	50.0	-16.7
12.473	12.5	20.7	33.2	50.0	-16.8
26.228	11.3	21.9	33.2	50.0	-16.8
28.202	11.1	22.1	33.2	50.0	-16.8
27.224	11.1	22.0	33.1	50.0	-16.9
27.661	11.0	22.1	33.1	50.0	-16.9
29.265	11.0	22.1	33.1	50.0	-16.9
29.709	11.0	22.1	33.1	50.0	-16.9
16.136	12.1	20.9	33.0	50.0	-17.0
21.505	11.7	21.3	33.0	50.0	-17.0
24.971	11.3	21.7	33.0	50.0	-17.0
26.657	11.1	21.9	33.0	50.0	-17.0
24.840	11.2	21.7	32.9	50.0	-17.1
27.892	10.8	22.1	32.9	50.0	-17.1
28.273	10.8	22.1	32.9	50.0	-17.1
12.883	12.1	20.7	32.8	50.0	-17.2
20.893	11.5	21.3	32.8	50.0	-17.2
21.192	11.5	21.3	32.8	50.0	-17.2
25.344	11.1	21.7	32.8	50.0	-17.2
27.512	10.7	22.1	32.8	50.0	-17.2
28.097	10.7	22.1	32.8	50.0	-17.2
17.677	11.7	21.0	32.7	50.0	-17.3
26.116	10.9	21.8	32.7	50.0	-17.3
27.000	10.8	21.9	32.7	50.0	-17.3
8.436	12.1	20.5	32.6	50.0	-17.4
15.457	11.7	20.9	32.6	50.0	-17.4
15.547	11.7	20.9	32.6	50.0	-17.4
18.028	11.6	21.0	32.6	50.0	-17.4
21.266	11.3	21.3	32.6	50.0	-17.4
23.542	11.1	21.5	32.6	50.0	-17.4
24.952	10.9	21.7	32.6	50.0	-17.4
26.754	10.7	21.9	32.6	50.0	-17.4
27.340	10.6	22.0	32.6	50.0	-17.4
28.150	10.5	22.1	32.6	50.0	-17.4
29.981	10.5	22.1	32.6	50.0	-17.4
15.939	11.6	20.9	32.5	50.0	-17.5
19.285	11.3	21.2	32.5	50.0	-17.5
25.721	10.7	21.8	32.5	50.0	-17.5
27.433	10.5	22.0	32.5	50.0	-17.5
27.687	10.4	22.1	32.5	50.0	-17.5
6.873	12.0	20.4	32.4	50.0	-17.6
9.593	11.8	20.6	32.4	50.0	-17.6
15.327	11.5	20.9	32.4	50.0	-17.6
15.864	11.5	20.9	32.4	50.0	-17.6
19.852	11.2	21.2	32.4	50.0	-17.6
21.658	11.1	21.3	32.4	50.0	-17.6
22.091	11.1	21.3	32.4	50.0	-17.6
23.867	10.9	21.5	32.4	50.0	-17.6
24.102	10.8	21.6	32.4	50.0	-17.6
26.441	10.5	21.9	32.4	50.0	-17.6
26.930	10.5	21.9	32.4	50.0	-17.6
29.493	10.3	22.1	32.4	50.0	-17.6
29.582	10.3	22.1	32.4	50.0	-17.6

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
29.881	10.3	22.1	32.4	60.0	-27.6
19.002	11.1	21.2	32.3	60.0	-27.7
23.441	10.8	21.5	32.3	60.0	-27.7
24.568	10.6	21.7	32.3	60.0	-27.7
24.598	10.6	21.7	32.3	60.0	-27.7
27.788	10.2	22.1	32.3	60.0	-27.7
28.239	10.2	22.1	32.3	60.0	-27.7
29.780	10.2	22.1	32.3	60.0	-27.7
14.446	11.4	20.8	32.2	60.0	-27.8
16.883	11.2	21.0	32.2	60.0	-27.8
17.923	11.2	21.0	32.2	60.0	-27.8
18.002	11.2	21.0	32.2	60.0	-27.8
19.196	11.0	21.2	32.2	60.0	-27.8
19.684	11.0	21.2	32.2	60.0	-27.8
23.154	10.7	21.5	32.2	60.0	-27.8
11.368	11.4	20.7	32.1	60.0	-27.9
13.999	11.4	20.7	32.1	60.0	-27.9
15.099	11.3	20.8	32.1	60.0	-27.9
17.129	11.1	21.0	32.1	60.0	-27.9
19.621	10.9	21.2	32.1	60.0	-27.9
20.419	10.9	21.2	32.1	60.0	-27.9
22.915	10.6	21.5	32.1	60.0	-27.9
23.926	10.6	21.5	32.1	60.0	-27.9
24.695	10.4	21.7	32.1	60.0	-27.9
12.223	11.3	20.7	32.0	60.0	-28.0
12.309	11.3	20.7	32.0	60.0	-28.0
13.342	11.3	20.7	32.0	60.0	-28.0
13.555	11.3	20.7	32.0	60.0	-28.0
13.708	11.3	20.7	32.0	60.0	-28.0
17.576	11.0	21.0	32.0	60.0	-28.0
22.050	10.7	21.3	32.0	60.0	-28.0
22.296	10.6	21.4	32.0	60.0	-28.0
22.848	10.5	21.5	32.0	60.0	-28.0
23.273	10.5	21.5	32.0	60.0	-28.0
24.001	10.5	21.5	32.0	60.0	-28.0
24.419	10.3	21.7	32.0	60.0	-28.0
8.511	11.4	20.5	31.9	60.0	-28.1
9.693	11.3	20.6	31.9	60.0	-28.1
10.104	11.3	20.6	31.9	60.0	-28.1
16.614	10.9	21.0	31.9	60.0	-28.1
18.103	10.9	21.0	31.9	60.0	-28.1
18.196	10.9	21.0	31.9	60.0	-28.1
19.919	10.7	21.2	31.9	60.0	-28.1
20.244	10.7	21.2	31.9	60.0	-28.1
20.789	10.6	21.3	31.9	60.0	-28.1
21.434	10.6	21.3	31.9	60.0	-28.1
22.602	10.4	21.5	31.9	60.0	-28.1
23.244	10.4	21.5	31.9	60.0	-28.1
24.206	10.3	21.6	31.9	60.0	-28.1
7.280	11.3	20.5	31.8	60.0	-28.2
11.697	11.1	20.7	31.8	60.0	-28.2
15.237	10.9	20.9	31.8	60.0	-28.2
15.827	10.9	20.9	31.8	60.0	-28.2
18.830	10.6	21.2	31.8	60.0	-28.2
19.472	10.6	21.2	31.8	60.0	-28.2
19.576	10.6	21.2	31.8	60.0	-28.2
19.587	10.6	21.2	31.8	60.0	-28.2
20.181	10.6	21.2	31.8	60.0	-28.2
20.528	10.6	21.2	31.8	60.0	-28.2
21.285	10.5	21.3	31.8	60.0	-28.2
23.012	10.3	21.5	31.8	60.0	-28.2
25.210	10.1	21.7	31.8	60.0	-28.2
25.572	10.0	21.8	31.8	60.0	-28.2
5.071	11.4	20.3	31.7	60.0	-28.3
6.254	11.3	20.4	31.7	60.0	-28.3
10.548	11.1	20.6	31.7	60.0	-28.3
12.794	11.0	20.7	31.7	60.0	-28.3
13.760	11.0	20.7	31.7	60.0	-28.3
14.372	11.0	20.7	31.7	60.0	-28.3
16.080	10.8	20.9	31.7	60.0	-28.3
16.483	10.7	21.0	31.7	60.0	-28.3
16.543	10.7	21.0	31.7	60.0	-28.3
17.453	10.7	21.0	31.7	60.0	-28.3
18.427	10.5	21.2	31.7	60.0	-28.3
19.412	10.5	21.2	31.7	60.0	-28.3
20.968	10.4	21.3	31.7	60.0	-28.3
21.027	10.4	21.3	31.7	60.0	-28.3
22.274	10.3	21.4	31.7	60.0	-28.3
23.389	10.2	21.5	31.7	60.0	-28.3
23.688	10.2	21.5	31.7	60.0	-28.3
24.318	10.1	21.6	31.7	60.0	-28.3
25.896	9.9	21.8	31.7	60.0	-28.3
7.817	11.1	20.5	31.6	60.0	-28.4
9.343	11.1	20.5	31.6	60.0	-28.4
9.410	11.0	20.6	31.6	60.0	-28.4
14.778	10.8	20.8	31.6	60.0	-28.4
16.815	10.6	21.0	31.6	60.0	-28.4
17.207	10.6	21.0	31.6	60.0	-28.4
18.677	10.4	21.2	31.6	60.0	-28.4
18.935	10.4	21.2	31.6	60.0	-28.4
20.255	10.4	21.2	31.6	60.0	-28.4
20.337	10.4	21.2	31.6	60.0	-28.4
20.580	10.4	21.2	31.6	60.0	-28.4
20.628	10.4	21.2	31.6	60.0	-28.4
21.076	10.3	21.3	31.6	60.0	-28.4
23.613	10.1	21.5	31.6	60.0	-28.4
5.119	11.2	20.3	31.5	60.0	-28.5

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
29.881	10.3	22.1	32.4	50.0	-17.6
19.002	11.1	21.2	32.3	50.0	-17.7
23.441	10.8	21.5	32.3	50.0	-17.7
24.568	10.6	21.7	32.3	50.0	-17.7
24.598	10.6	21.7	32.3	50.0	-17.7
27.788	10.2	22.1	32.3	50.0	-17.7
28.239	10.2	22.1	32.3	50.0	-17.7
29.780	10.2	22.1	32.3	50.0	-17.7
14.446	11.4	20.8	32.2	50.0	-17.8
16.883	11.2	21.0	32.2	50.0	-17.8
17.923	11.2	21.0	32.2	50.0	-17.8
18.002	11.2	21.0	32.2	50.0	-17.8
19.196	11.0	21.2	32.2	50.0	-17.8
19.684	11.0	21.2	32.2	50.0	-17.8
23.154	10.7	21.5	32.2	50.0	-17.8
11.368	11.4	20.7	32.1	50.0	-17.9
13.999	11.4	20.7	32.1	50.0	-17.9
15.099	11.3	20.8	32.1	50.0	-17.9
17.129	11.1	21.0	32.1	50.0	-17.9
19.621	10.9	21.2	32.1	50.0	-17.9
20.419	10.9	21.2	32.1	50.0	-17.9
22.915	10.6	21.5	32.1	50.0	-17.9
23.926	10.6	21.5	32.1	50.0	-17.9
24.695	10.4	21.7	32.1	50.0	-17.9
12.223	11.3	20.7	32.0	50.0	-18.0
12.309	11.3	20.7	32.0	50.0	-18.0
13.342	11.3	20.7	32.0	50.0	-18.0
13.555	11.3	20.7	32.0	50.0	-18.0
13.708	11.3	20.7	32.0	50.0	-18.0
17.576	11.0	21.0	32.0	50.0	-18.0
22.050	10.7	21.3	32.0	50.0	-18.0
22.296	10.6	21.4	32.0	50.0	-18.0
22.848	10.5	21.5	32.0	50.0	-18.0
23.273	10.5	21.5	32.0	50.0	-18.0
24.001	10.5	21.5	32.0	50.0	-18.0
24.419	10.3	21.7	32.0	50.0	-18.0
8.511	11.4	20.5	31.9	50.0	-18.1
9.693	11.3	20.6	31.9	50.0	-18.1
10.104	11.3	20.6	31.9	50.0	-18.1
16.614	10.9	21.0	31.9	50.0	-18.1
18.103	10.9	21.0	31.9	50.0	-18.1
18.196	10.9	21.0	31.9	50.0	-18.1
19.919	10.7	21.2	31.9	50.0	-18.1
20.244	10.7	21.2	31.9	50.0	-18.1
20.789	10.6	21.3	31.9	50.0	-18.1
21.434	10.6	21.3	31.9	50.0	-18.1
22.602	10.4	21.5	31.9	50.0	-18.1
23.244	10.4	21.5	31.9	50.0	-18.1
24.206	10.3	21.6	31.9	50.0	-18.1
7.280	11.3	20.5	31.8	50.0	-18.2
11.697	11.1	20.7	31.8	50.0	-18.2
15.237	10.9	20.9	31.8	50.0	-18.2
15.827	10.9	20.9	31.8	50.0	-18.2
18.830	10.6	21.2	31.8	50.0	-18.2
19.472	10.6	21.2	31.8	50.0	-18.2
19.576	10.6	21.2	31.8	50.0	-18.2
19.587	10.6	21.2	31.8	50.0	-18.2
20.181	10.6	21.2	31.8	50.0	-18.2
20.528	10.6	21.2	31.8	50.0	-18.2
21.285	10.5	21.3	31.8	50.0	-18.2
23.012	10.3	21.5	31.8	50.0	-18.2
25.210	10.1	21.7	31.8	50.0	-18.2
25.572	10.0	21.8	31.8	50.0	-18.2
5.071	11.4	20.3	31.7	50.0	-18.3
6.254	11.3	20.4	31.7	50.0	-18.3
10.548	11.1	20.6	31.7	50.0	-18.3
12.794	11.0	20.7	31.7	50.0	-18.3
13.760	11.0	20.7	31.7	50.0	-18.3
14.372	11.0	20.7	31.7	50.0	-18.3
16.080	10.8	20.9	31.7	50.0	-18.3
16.483	10.7	21.0	31.7	50.0	-18.3
16.543	10.7	21.0	31.7	50.0	-18.3
17.453	10.7	21.0	31.7	50.0	-18.3
18.427	10.5	21.2	31.7	50.0	-18.3
19.412	10.5	21.2	31.7	50.0	-18.3
20.968	10.4	21.3	31.7	50.0	-18.3
21.027	10.4	21.3	31.7	50.0	-18.3
22.274	10.3	21.4	31.7	50.0	-18.3
23.389	10.2	21.5	31.7	50.0	-18.3
23.688	10.2	21.5	31.7	50.0	-18.3
24.318	10.1	21.6	31.7	50.0	-18.3
25.896	9.9	21.8	31.7	50.0	-18.3
7.817	11.1	20.5	31.6	50.0	-18.4
9.343	11.1	20.5	31.6	50.0	-18.4
9.410	11.0	20.6	31.6	50.0	-18.4
14.778	10.8	20.8	31.6	50.0	-18.4
16.815	10.6	21.0	31.6	50.0	-18.4
17.207	10.6	21.0	31.6	50.0	-18.4
18.677	10.4	21.2	31.6	50.0	-18.4
18.935	10.4	21.2	31.6	50.0	-18.4
20.255	10.4	21.2	31.6	50.0	-18.4
20.337	10.4	21.2	31.6	50.0	-18.4
20.580	10.4	21.2	31.6	50.0	-18.4
20.628	10.4	21.2	31.6	50.0	-18.4
21.076	10.3	21.3	31.6	50.0	-18.4
23.613	10.1	21.5	31.6	50.0	-18.4
5.119	11.2	20.3	31.5	50.0	-18.5

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
7.205	11.0	20.5	31.5	60.0	-28.5
8.171	11.0	20.5	31.5	60.0	-28.5
13.655	10.8	20.7	31.5	60.0	-28.5
14.506	10.7	20.8	31.5	60.0	-28.5
14.760	10.7	20.8	31.5	60.0	-28.5
16.334	10.5	21.0	31.5	60.0	-28.5
19.050	10.3	21.2	31.5	60.0	-28.5
20.054	10.3	21.2	31.5	60.0	-28.5
21.979	10.2	21.3	31.5	60.0	-28.5
7.074	10.9	20.5	31.4	60.0	-28.6
7.242	10.9	20.5	31.4	60.0	-28.6
11.242	10.8	20.6	31.4	60.0	-28.6
13.185	10.7	20.7	31.4	60.0	-28.6
14.420	10.7	20.7	31.4	60.0	-28.6
14.991	10.6	20.8	31.4	60.0	-28.6
15.655	10.5	20.9	31.4	60.0	-28.6
16.577	10.4	21.0	31.4	60.0	-28.6
7.578	10.8	20.5	31.3	60.0	-28.7
11.059	10.7	20.6	31.3	60.0	-28.7
11.771	10.6	20.7	31.3	60.0	-28.7
12.413	10.6	20.7	31.3	60.0	-28.7
12.659	10.6	20.7	31.3	60.0	-28.7
12.768	10.6	20.7	31.3	60.0	-28.7
14.062	10.6	20.7	31.3	60.0	-28.7
14.842	10.5	20.8	31.3	60.0	-28.7
16.939	10.3	21.0	31.3	60.0	-28.7
18.744	10.1	21.2	31.3	60.0	-28.7
20.479	10.1	21.2	31.3	60.0	-28.7
7.134	10.7	20.5	31.2	60.0	-28.8
9.835	10.6	20.6	31.2	60.0	-28.8
10.611	10.6	20.6	31.2	60.0	-28.8
12.103	10.5	20.7	31.2	60.0	-28.8
12.637	10.5	20.7	31.2	60.0	-28.8
12.943	10.5	20.7	31.2	60.0	-28.8
13.301	10.5	20.7	31.2	60.0	-28.8
14.185	10.5	20.7	31.2	60.0	-28.8
15.181	10.3	20.9	31.2	60.0	-28.8
21.900	9.9	21.3	31.2	60.0	-28.8
7.612	10.6	20.5	31.1	60.0	-28.9
7.694	10.6	20.5	31.1	60.0	-28.9
9.156	10.6	20.5	31.1	60.0	-28.9
9.249	10.6	20.5	31.1	60.0	-28.9
9.764	10.5	20.6	31.1	60.0	-28.9
14.390	10.4	20.7	31.1	60.0	-28.9
16.435	10.1	21.0	31.1	60.0	-28.9
19.382	9.9	21.2	31.1	60.0	-28.9
5.220	10.7	20.3	31.0	60.0	-29.0
5.851	10.6	20.4	31.0	60.0	-29.0
8.104	10.5	20.5	31.0	60.0	-29.0
8.294	10.5	20.5	31.0	60.0	-29.0
8.399	10.5	20.5	31.0	60.0	-29.0
8.977	10.5	20.5	31.0	60.0	-29.0
11.148	10.4	20.6	31.0	60.0	-29.0
11.887	10.3	20.7	31.0	60.0	-29.0
13.368	10.3	20.7	31.0	60.0	-29.0
14.129	10.3	20.7	31.0	60.0	-29.0
17.002	10.0	21.0	31.0	60.0	-29.0
22.419	9.6	21.4	31.0	60.0	-29.0
6.485	10.5	20.4	30.9	60.0	-29.1
8.048	10.4	20.5	30.9	60.0	-29.1
10.951	10.3	20.6	30.9	60.0	-29.1
11.659	10.2	20.7	30.9	60.0	-29.1
6.552	10.4	20.4	30.8	60.0	-29.2
6.586	10.4	20.4	30.8	60.0	-29.2
7.492	10.3	20.5	30.8	60.0	-29.2
7.981	10.3	20.5	30.8	60.0	-29.2
9.089	10.3	20.5	30.8	60.0	-29.2
9.514	10.2	20.6	30.8	60.0	-29.2
11.857	10.1	20.7	30.8	60.0	-29.2
15.707	9.9	20.9	30.8	60.0	-29.2
5.090	10.4	20.3	30.7	60.0	-29.3
6.313	10.3	20.4	30.7	60.0	-29.3
7.018	10.3	20.4	30.7	60.0	-29.3
11.305	10.1	20.6	30.7	60.0	-29.3
13.890	10.0	20.7	30.7	60.0	-29.3
5.653	10.3	20.3	30.6	60.0	-29.4
5.981	10.2	20.4	30.6	60.0	-29.4
8.723	10.1	20.5	30.6	60.0	-29.4
8.880	10.1	20.5	30.6	60.0	-29.4
10.272	10.0	20.6	30.6	60.0	-29.4
11.604	9.9	20.7	30.6	60.0	-29.4
5.239	10.2	20.3	30.5	60.0	-29.5
5.560	10.2	20.3	30.5	60.0	-29.5
7.776	10.0	20.5	30.5	60.0	-29.5
8.798	10.0	20.5	30.5	60.0	-29.5
9.992	9.9	20.6	30.5	60.0	-29.5
10.656	9.9	20.6	30.5	60.0	-29.5
11.421	9.7	20.7	30.4	60.0	-29.6
11.473	9.7	20.7	30.4	60.0	-29.6
5.694	10.0	20.3	30.3	60.0	-29.7
13.137	9.6	20.7	30.3	60.0	-29.7
14.267	9.5	20.7	30.2	60.0	-29.8
10.458	9.5	20.6	30.1	60.0	-29.9

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
7.205	11.0	20.5	31.5	50.0	-18.5
8.171	11.0	20.5	31.5	50.0	-18.5
13.655	10.8	20.7	31.5	50.0	-18.5
14.506	10.7	20.8	31.5	50.0	-18.5
14.760	10.7	20.8	31.5	50.0	-18.5
16.334	10.5	21.0	31.5	50.0	-18.5
19.050	10.3	21.2	31.5	50.0	-18.5
20.054	10.3	21.2	31.5	50.0	-18.5
21.979	10.2	21.3	31.5	50.0	-18.5
7.074	10.9	20.5	31.4	50.0	-18.6
7.242	10.9	20.5	31.4	50.0	-18.6
11.242	10.8	20.6	31.4	50.0	-18.6
13.185	10.7	20.7	31.4	50.0	-18.6
14.420	10.7	20.7	31.4	50.0	-18.6
14.991	10.6	20.8	31.4	50.0	-18.6
15.655	10.5	20.9	31.4	50.0	-18.6
16.577	10.4	21.0	31.4	50.0	-18.6
7.578	10.8	20.5	31.3	50.0	-18.7
11.059	10.7	20.6	31.3	50.0	-18.7
11.771	10.6	20.7	31.3	50.0	-18.7
12.413	10.6	20.7	31.3	50.0	-18.7
12.659	10.6	20.7	31.3	50.0	-18.7
12.768	10.6	20.7	31.3	50.0	-18.7
14.062	10.6	20.7	31.3	50.0	-18.7
14.842	10.5	20.8	31.3	50.0	-18.7
16.939	10.3	21.0	31.3	50.0	-18.7
18.744	10.1	21.2	31.3	50.0	-18.7
20.479	10.1	21.2	31.3	50.0	-18.7
7.134	10.7	20.5	31.2	50.0	-18.8
9.835	10.6	20.6	31.2	50.0	-18.8
10.611	10.6	20.6	31.2	50.0	-18.8
12.103	10.5	20.7	31.2	50.0	-18.8
12.637	10.5	20.7	31.2	50.0	-18.8
12.943	10.5	20.7	31.2	50.0	-18.8
13.301	10.5	20.7	31.2	50.0	-18.8
14.185	10.5	20.7	31.2	50.0	-18.8
15.181	10.3	20.9	31.2	50.0	-18.8
21.900	9.9	21.3	31.2	50.0	-18.8
7.612	10.6	20.5	31.1	50.0	-18.9
7.694	10.6	20.5	31.1	50.0	-18.9
9.156	10.6	20.5	31.1	50.0	-18.9
9.249	10.6	20.5	31.1	50.0	-18.9
9.764	10.5	20.6	31.1	50.0	-18.9
14.390	10.4	20.7	31.1	50.0	-18.9
16.435	10.1	21.0	31.1	50.0	-18.9
19.382	9.9	21.2	31.1	50.0	-18.9
5.220	10.7	20.3	31.0	50.0	-19.0
5.851	10.6	20.4	31.0	50.0	-19.0
8.104	10.5	20.5	31.0	50.0	-19.0
8.294	10.5	20.5	31.0	50.0	-19.0
8.399	10.5	20.5	31.0	50.0	-19.0
8.977	10.5	20.5	31.0	50.0	-19.0
11.148	10.4	20.6	31.0	50.0	-19.0
11.887	10.3	20.7	31.0	50.0	-19.0
13.368	10.3	20.7	31.0	50.0	-19.0
14.129	10.3	20.7	31.0	50.0	-19.0
17.002	10.0	21.0	31.0	50.0	-19.0
22.419	9.6	21.4	31.0	50.0	-19.0
6.485	10.5	20.4	30.9	50.0	-19.1
8.048	10.4	20.5	30.9	50.0	-19.1
10.951	10.3	20.6	30.9	50.0	-19.1
11.659	10.2	20.7	30.9	50.0	-19.1
6.552	10.4	20.4	30.8	50.0	-19.2
6.586	10.4	20.4	30.8	50.0	-19.2
7.492	10.3	20.5	30.8	50.0	-19.2
7.981	10.3	20.5	30.8	50.0	-19.2
9.089	10.3	20.5	30.8	50.0	-19.2
9.514	10.2	20.6	30.8	50.0	-19.2
11.857	10.1	20.7	30.8	50.0	-19.2
15.707	9.9	20.9	30.8	50.0	-19.2
5.090	10.4	20.3	30.7	50.0	-19.3
6.313	10.3	20.4	30.7	50.0	-19.3
7.018	10.3	20.4	30.7	50.0	-19.3
11.305	10.1	20.6	30.7	50.0	-19.3
13.890	10.0	20.7	30.7	50.0	-19.3
5.653	10.3	20.3	30.6	50.0	-19.4
5.981	10.2	20.4	30.6	50.0	-19.4
8.723	10.1	20.5	30.6	50.0	-19.4
8.880	10.1	20.5	30.6	50.0	-19.4
10.272	10.0	20.6	30.6	50.0	-19.4
11.604	9.9	20.7	30.6	50.0	-19.4
5.239	10.2	20.3	30.5	50.0	-19.5
5.560	10.2	20.3	30.5	50.0	-19.5
7.776	10.0	20.5	30.5	50.0	-19.5
8.798	10.0	20.5	30.5	50.0	-19.5
9.992	9.9	20.6	30.5	50.0	-19.5
10.656	9.9	20.6	30.5	50.0	-19.5
11.421	9.7	20.7	30.4	50.0	-19.6
11.473	9.7	20.7	30.4	50.0	-19.6
5.694	10.0	20.3	30.3	50.0	-19.7
13.137	9.6	20.7	30.3	50.0	-19.7
14.267	9.5	20.7	30.2	50.0	-19.8
10.458	9.5	20.6	30.1	50.0	-19.9

FIELD STRENGTH OF FUNDAMENTAL



PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuously Transmitting Unmodulated at 319.5 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

UTC0083 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 1000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Element	10kHz-1GHz RE Cables	OCH	1-Aug-2017	12 mo
Antenna - Biconilog	Teseg	CBL 6141A	AYE	7-Nov-2017	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-2017	12 mo

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was configured for continuous un-modulated CW operation at its single transmit frequency. The field strength of the transmit frequency was maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.10:2013).

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{ms}$ or T, whichever is less. (Where T is the period of the pulse train.)

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec

Pulsewidth of Type 1 Pulse = 0.9791 mSec

Pulsewidth of Type 2 Pulse = 0.1251 mSec

Pulsewidth of Type 3 Pulse = 0.4913 mSec

Number of Type 1 Pulses = 1

Number of Type 2 Pulses = 63

Number of Type 3 Pulses = 1

Duty Cycle = $20 \log [(1)(0.9791) + (63)(0.1251) + (1)(0.4913)]/100 = -20.58 \text{ dB}$

The duty cycle correction factor of -20.58 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

FIELD STRENGTH OF FUNDAMENTAL



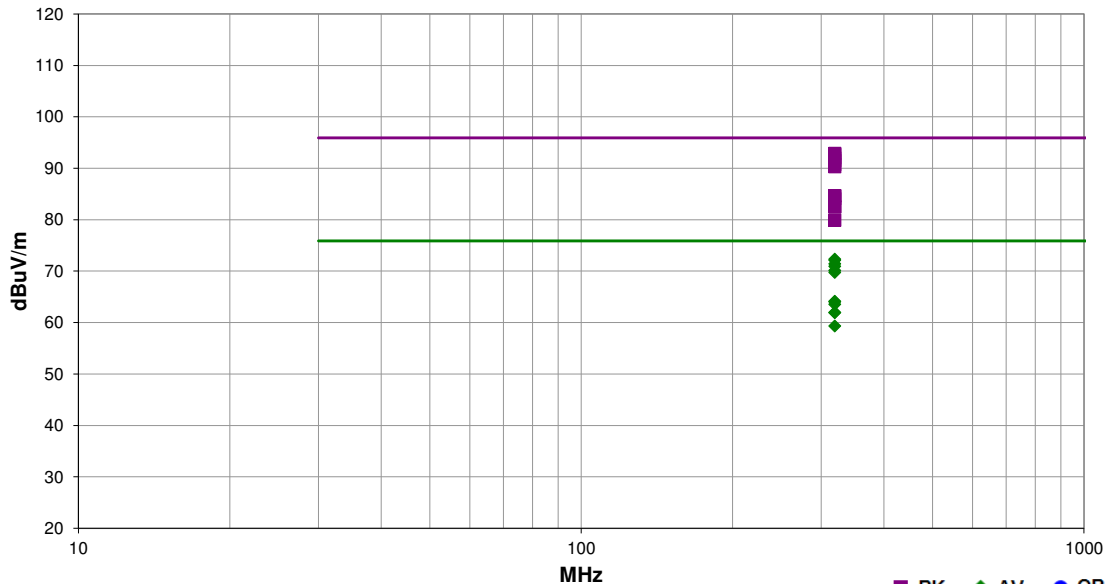
EmiRS 2018.02.06

PSA-ESCI 2017.12.19

Work Order:	UTCF0083	Date:	9-Mar-2018	
Project:	None	Temperature:	20.2 °C	
Job Site:	OC10	Humidity:	37.8% RH	
Serial Number:	502 2024 1091036	Barometric Pres.:	1018 mbar	Tested by: Johnny Candelas
EUT:	319.5 MHz OEM Transceiver w/Crystal TX			
Configuration:	3			
Customer:	UTC Fire and Security			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Continuously Transmitting Unmodulated at 319.5 MHz			
Deviations:	None			
Comments:	Tested Left Antenna and Right Antenna Individually			

Test Specifications	Test Method
FCC 15.231:2018	ANSI C63.10:2013

Run #	2	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
319.503	70.1	22.8	1.0	23.0		0.0	Horz	PK	0.0	92.9	95.9	-3.0	EUT on Side, Left Ant
319.503	69.9	22.8	1.1	108.0		0.0	Horz	PK	0.0	92.7	95.9	-3.2	EUT Horiz, Right Ant
319.503	70.1	22.8	1.0	23.0	-20.6	0.0	Horz	AV	0.0	72.3	75.9	-3.6	EUT on Side, Left Ant
319.503	69.9	22.8	1.1	108.0	-20.6	0.0	Horz	AV	0.0	72.1	75.9	-3.8	EUT Horiz, Right Ant
319.505	69.2	22.8	1.0	9.0		0.0	Horz	PK	0.0	92.0	95.9	-3.9	EUT on Side, Right Ant
319.502	68.7	22.8	1.2	112.0		0.0	Horz	PK	0.0	91.5	95.9	-4.4	EUT Horiz, Left Ant
319.505	69.2	22.8	1.0	9.0	-20.6	0.0	Horz	AV	0.0	71.4	75.9	-4.5	EUT on Side, Right Ant
319.502	68.7	22.8	1.2	112.0	-20.6	0.0	Horz	AV	0.0	70.9	75.9	-5.0	EUT Horiz, Left Ant
319.505	67.9	22.8	1.9	149.0		0.0	Vert	PK	0.0	90.7	95.9	-5.2	EUT Vert, Right Ant
319.503	67.5	22.8	1.9	148.0		0.0	Vert	PK	0.0	90.3	95.9	-5.6	EUT Vert, Left Ant
319.505	67.9	22.8	1.9	149.0	-20.6	0.0	Vert	AV	0.0	70.1	75.9	-5.8	EUT Horiz, Right Ant
319.503	67.5	22.8	1.9	148.0	-20.6	0.0	Vert	AV	0.0	69.7	75.9	-6.2	EUT Vert, Left Ant
319.503	61.9	22.8	1.6	171.0		0.0	Vert	PK	0.0	84.7	95.9	-11.2	EUT Horiz, Right Ant
319.505	61.8	22.8	1.0	316.0		0.0	Horz	PK	0.0	84.6	95.9	-11.3	EUT Vert, Right Ant
319.503	61.9	22.8	1.6	171.0	-20.6	0.0	Vert	AV	0.0	64.1	75.9	-11.8	EUT Horiz, Right Ant
319.503	61.3	22.8	3.8	110.0		0.0	Vert	PK	0.0	84.1	95.9	-11.8	EUT on Side, Left Ant
319.505	61.8	22.8	1.0	316.0	-20.6	0.0	Horz	AV	0.0	64.0	75.9	-11.9	EUT Vert, Right Ant
319.503	61.3	22.8	3.8	110.0	-20.6	0.0	Vert	AV	0.0	63.5	75.9	-12.4	EUT on Side, Left Ant
319.505	59.7	22.8	1.0	224.0		0.0	Horz	PK	0.0	82.5	95.9	-13.4	EUT Vert, Left Ant
319.505	59.7	22.8	1.4	179.0		0.0	Vert	PK	0.0	82.5	95.9	-13.4	EUT Horiz, Left Ant
319.505	59.7	22.8	1.0	224.0	-20.6	0.0	Horz	AV	0.0	61.9	75.9	-14.0	EUT Vert, Left Ant
319.505	59.7	22.8	1.4	179.0	-20.6	0.0	Vert	AV	0.0	61.9	75.9	-14.0	EUT Horiz, Left Ant
319.507	57.1	22.8	3.8	294.0		0.0	Vert	PK	0.0	79.9	95.9	-16.0	EUT on Side, Right Ant
319.507	57.1	22.8	3.8	294.0	-20.6	0.0	Vert	AV	0.0	59.3	75.9	-16.6	EUT on Side, Right Ant

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.12.19

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuously Transmitting Unmodulated at 319.5 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

UTCF0083 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	4000 MHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator	Fairview Microwave	SA18H-10	TKP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	1-Aug-2017	12 mo
Cable	Element	10kHz-1GHz RE Cables	OCH	1-Aug-2017	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	13-Jul-2017	12 mo
Cable	Element	1-8GHz RE Cables	OCJ	13-Jul-2017	12 mo
Antenna - Double Ridge	ETS Lindgren	3117	AHQ	28-Sep-2017	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAV	21-Nov-2017	12 mo

TEST DESCRIPTION

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{ms}$ or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec
Pulsewidth of Type 1 Pulse = 0.9791 mSec
Pulsewidth of Type 2 Pulse = 0.1251 mSec
Pulsewidth of Type 3 Pulse = 0.4913 mSec
Number of Type 1 Pulses = 1
Number of Type 2 Pulses = 63
Number of Type 3 Pulses = 1

Duty Cycle = $20 \log [(1)(0.9791) + (63)(0.1251) + (1)(0.4913)]/100 = -20.58 \text{ dB}$

The duty cycle correction factor of -20.58 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz for measurements at or below 1GHz. Above 1GHz, a resolution bandwidth of 1MHz and a video bandwidth of 3MHz was used.

SPURIOUS RADIATED EMISSIONS



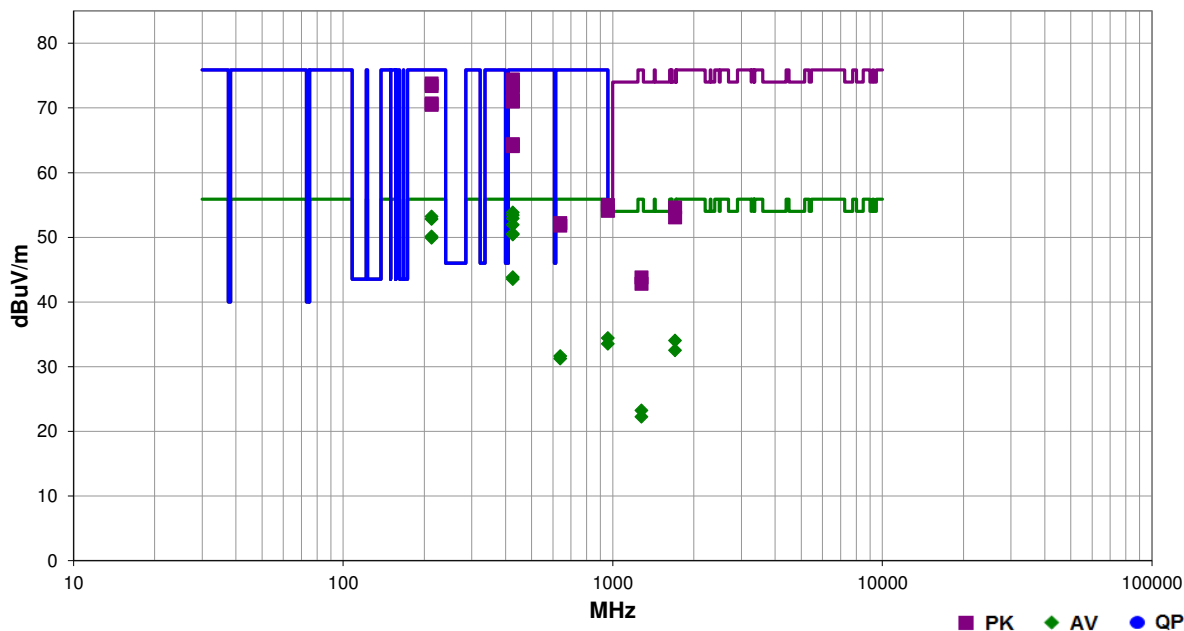
EmiRS 2018.02.06

PSA-ESCI 2017.12.19

Work Order:	UTCF0083	Date:	9-Mar-2018	
Project:	None	Temperature:	20.2 °C	
Job Site:	OC10	Humidity:	37.8% RH	
Serial Number:	502 2024 1091036	Barometric Pres.:	1018 mbar	Tested by: Johnny Candelas
EUT:	319.5 MHz OEM Transceiver w/Crystal TX			
Configuration:	3			
Customer:	UTC Fire and Security			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Continuously Transmitting Unmodulated at 319.5 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 15.231:2018	ANSI C63.10:2013

Run #	3	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
426.007	56.0	8.4	1.0	93.0		10.0	Horz	PK	0.0	74.4	75.9	-1.5	EUT Horiz, Left Ant
426.008	55.6	8.4	1.0	101.0		10.0	Horz	PK	0.0	74.0	75.9	-1.9	EUT Horiz, Right Ant
426.007	56.0	8.4	1.0	93.0	-20.6	10.0	Horz	AV	0.0	53.8	55.9	-2.1	EUT Horiz, Left Ant
212.998	61.1	2.7	1.0	154.0		10.0	Horz	PK	0.0	73.8	75.9	-2.1	EUT Horiz, Left Ant
426.007	55.1	8.4	1.0	358.0		10.0	Horz	PK	0.0	73.5	75.9	-2.4	EUT on Side, Left Ant
426.008	55.6	8.4	1.0	101.0	-20.6	10.0	Horz	AV	0.0	53.4	55.9	-2.5	EUT Horiz, Right Ant
213.000	60.7	2.7	1.5	267.0		10.0	Horz	PK	0.0	73.4	75.9	-2.5	EUT Horiz, Right Ant
212.998	61.1	2.7	1.0	154.0	-20.6	10.0	Horz	AV	0.0	53.2	55.9	-2.7	EUT Horiz, Left Ant
426.007	55.1	8.4	1.0	358.0	-20.6	10.0	Horz	AV	0.0	52.9	55.9	-3.0	EUT on Side, Left Ant
213.000	60.7	2.7	1.5	267.0	-20.6	10.0	Horz	AV	0.0	52.8	55.9	-3.1	EUT Horiz, Right Ant
426.007	54.1	8.4	1.3	119.0		10.0	Vert	PK	0.0	72.5	75.9	-3.4	EUT Vert, Left Ant
426.007	54.1	8.4	1.3	119.0	-20.6	10.0	Vert	AV	0.0	51.9	55.9	-4.0	EUT Vert, Left Ant
426.007	52.7	8.4	1.5	276.0		10.0	Vert	PK	0.0	71.1	75.9	-4.8	EUT Vert, Right Ant
426.000	52.6	8.4	1.0	167.0		10.0	Horz	PK	0.0	71.0	75.9	-4.9	EUT Vert, Left Ant
213.000	58.0	2.7	1.0	335.0		10.0	Vert	PK	0.0	70.7	75.9	-5.2	EUT Vert, Left Ant
426.007	52.7	8.4	1.5	276.0	-20.6	10.0	Vert	AV	0.0	50.5	55.9	-5.4	EUT Vert, Right Ant
213.000	57.8	2.7	1.0	117.0		10.0	Vert	PK	0.0	70.5	75.9	-5.4	EUT Vert, Right Ant
426.000	52.6	8.4	1.0	167.0	-20.6	10.0	Horz	AV	0.0	50.4	55.9	-5.5	EUT Vert, Left Ant

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
213.000	58.0	2.7	1.0	335.0	-20.6	10.0	Vert	AV	0.0	50.1	55.9	-5.8	EUT Vert, Left Ant
213.000	57.8	2.7	1.0	117.0	-20.6	10.0	Vert	AV	0.0	49.9	55.9	-6.0	EUT Vert, Right Ant
425.998	46.0	8.4	1.3	137.0		10.0	Vert	PK	0.0	64.4	75.9	-11.5	EUT on Side, Left Ant
425.995	45.7	8.4	2.8	354.0		10.0	Vert	PK	0.0	64.1	75.9	-11.8	EUT Horiz, Left Ant
425.998	46.0	8.4	1.3	137.0	-20.6	10.0	Vert	AV	0.0	43.8	55.9	-12.1	EUT on Side, Left Ant
425.995	45.7	8.4	2.8	354.0	-20.6	10.0	Vert	AV	0.0	43.5	55.9	-12.4	EUT Horiz, Left Ant
1703.958	51.9	2.7	1.7	0.0		0.0	Vert	PK	0.0	54.6	74.0	-19.4	EUT Vert, Left Ant
1703.958	51.9	2.7	1.7	0.0	-20.6	0.0	Vert	AV	0.0	34.0	54.0	-20.0	EUT Vert, Left Ant
958.534	24.6	20.4	1.2	116.0		10.0	Horz	PK	0.0	55.0	75.9	-20.9	EUT Horiz, Left Ant
1704.117	50.4	2.7	1.0	18.0		0.0	Horz	PK	0.0	53.1	74.0	-20.9	EUT Horiz, Left Ant
958.534	24.6	20.4	1.2	116.0	-20.6	10.0	Horz	AV	0.0	34.4	55.9	-21.5	EUT Horiz, Left Ant
1704.117	50.4	2.7	1.0	18.0	-20.6	0.0	Horz	AV	0.0	32.5	54.0	-21.5	EUT Horiz, Left Ant
958.539	23.7	20.4	1.1	194.0		10.0	Vert	PK	0.0	54.1	75.9	-21.8	EUT Vert, Left Ant
958.539	23.7	20.4	1.1	194.0	-20.6	10.0	Vert	AV	0.0	33.5	55.9	-22.4	EUT Vert, Left Ant
639.003	29.0	13.2	1.7	309.0		10.0	Horz	PK	0.0	52.2	75.9	-23.7	EUT Horiz, Left Ant
638.993	28.6	13.2	1.0	251.0		10.0	Vert	PK	0.0	51.8	75.9	-24.1	EUT Vert, Left Ant
639.003	29.0	13.2	1.7	309.0	-20.6	10.0	Horz	AV	0.0	31.6	55.9	-24.3	EUT Horiz, Left Ant
638.993	28.6	13.2	1.0	251.0	-20.6	10.0	Vert	AV	0.0	31.2	55.9	-24.7	EUT Vert, Left Ant
1277.835	42.9	0.9	1.4	281.0		0.0	Horz	PK	0.0	43.8	75.9	-32.1	EUT Horiz, Left Ant
1277.835	42.9	0.9	1.4	281.0	-20.6	0.0	Horz	AV	0.0	23.2	55.9	-32.7	EUT Horiz, Left Ant
1277.990	41.9	0.9	2.3	158.0		0.0	Vert	PK	0.0	42.8	75.9	-33.1	EUT Vert, Left Ant
1277.990	41.9	0.9	2.3	158.0	-20.6	0.0	Vert	AV	0.0	22.2	55.9	-33.7	EUT Vert, Left Ant

OCCUPIED BANDWIDTH



XMI 2017.12.13

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	Com-Power	PS-400	IPF	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-17	21-Nov-18

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer. The EUT was transmitting at its maximum data rate.

The 20 dB occupied bandwidth is required to be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

OCCUPIED BANDWIDTH



XMM 2017.12.13

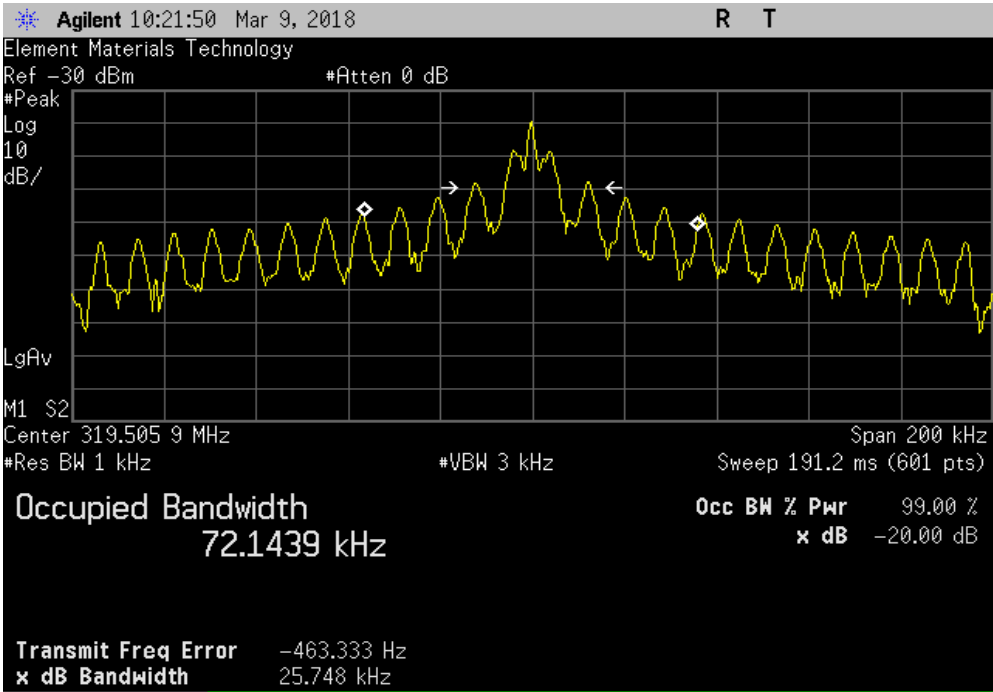
EUT: 319.5 MHz OEM Transceiver w/Crystal TX		Work Order: UTCF0083	
Serial Number: 502 2024 1091091		Date: 9-Mar-18	
Customer: UTC Fire and Security		Temperature: 21.5 °C	
Attendees: Konstantin Khrustov		Humidity: 40.2% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Johnny Candelas	Power: Battery	Job Site: OC10	
TEST SPECIFICATIONS		Test Method	
FCC 15.231:2018		ANSI C63.10:2013	
COMMENTS			
Limit based on center frequency: 319.5 MHz * 0.25% = 0.79875 MHz.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value	Limit
319.5 MHz		25.748 kHz	798.75 kHz
			Result
			Pass

OCCUPIED BANDWIDTH



XMM 2017.12.13

319.5 MHz						
				Value	Limit	Result
				25.748 kHz	798.75 kHz	Pass



DUTY CYCLE



XMIT 2017.12.13

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Probe - Near Field Set	Com-Power	PS-400	IPF	NCR	NCR
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	21-Nov-17	21-Nov-18

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer. The EUT was transmitting at its maximum data rate.

For software controlled or pre-programmed devices, the manufacturer shall declare the duty cycle class or classes for the equipment under test. For manually operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmission is constant until the trigger is released or manually reset. The manufacturer shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and hence the duty class.

Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

To derive average emission measurements, a duty cycle correction factor was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{mS}$ or T, whichever is less. (Where T is the period of the pulse train.)

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec

Pulsewidth of Type 1 Pulse = 0.9791 mSec

Pulsewidth of Type 2 Pulse = 0.1251 mSec

Pulsewidth of Type 3 Pulse = 0.4913 mSec

Number of Type 1 Pulses = 1

Number of Type 2 Pulses = 63

Number of Type 3 Pulses = 1

Duty Cycle = $20 \log [(1)(0.9791) + (63)(0.1251) + (1)(0.4913)]/100] = -20.58 \text{ dB}$

The duty cycle correction factor of -20.58 dB was added to the peak readings to mathematically derive the average levels. Peak

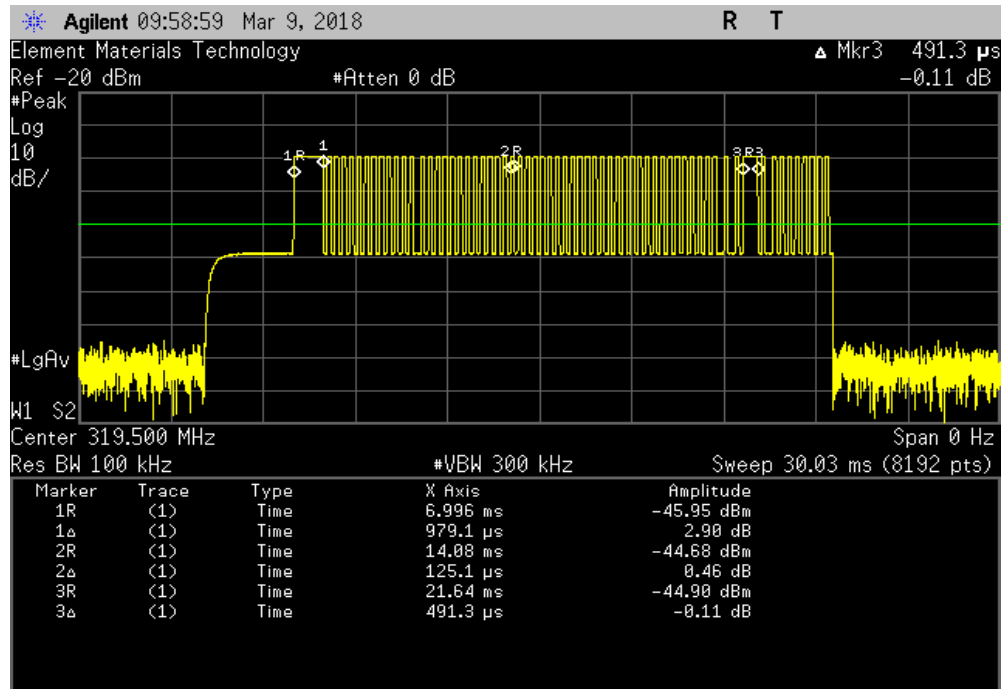
XMit 2017.12.13

DUTY CYCLE

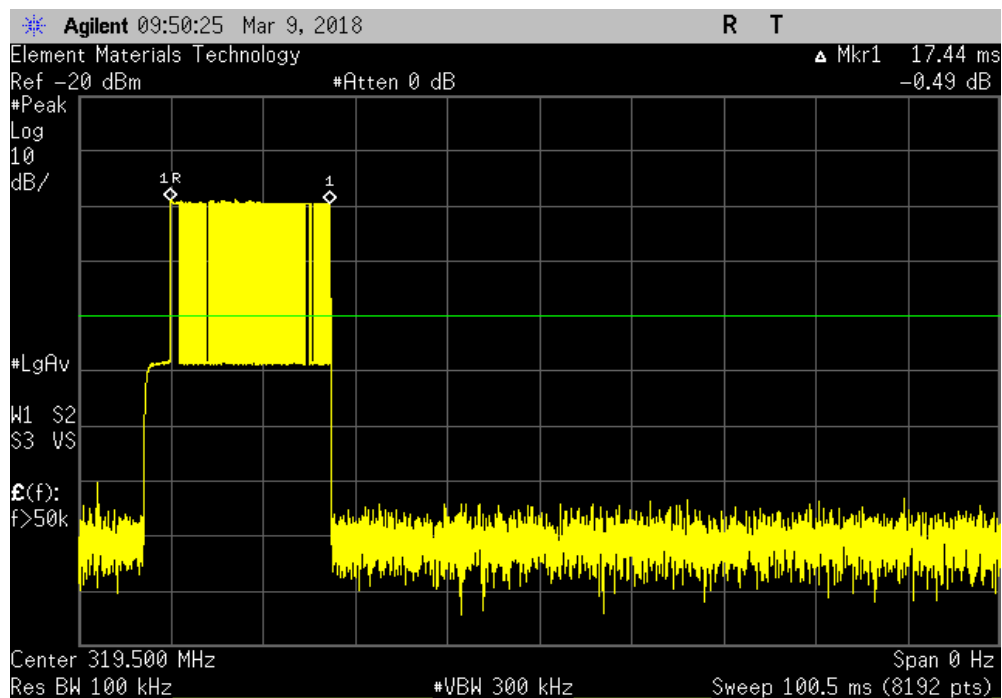


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30ms Interval						
	Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result	
	0.9791	0.1251	0.4913	N/A	N/A	



100ms Interval						
	Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result	
	N/A	N/A	N/A	N/A	N/A	

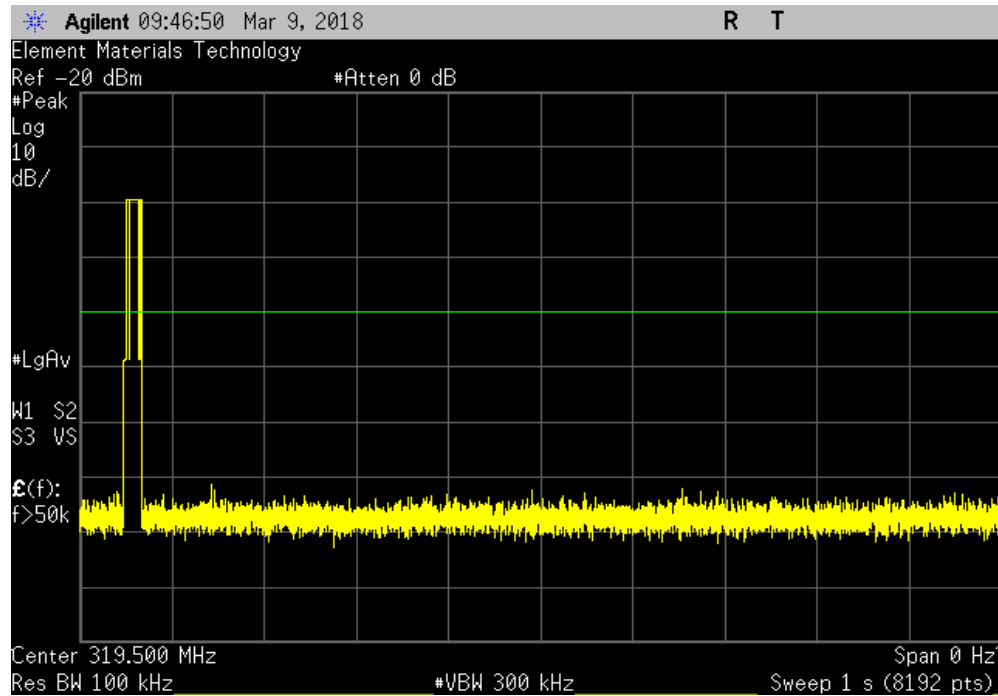


DUTY CYCLE

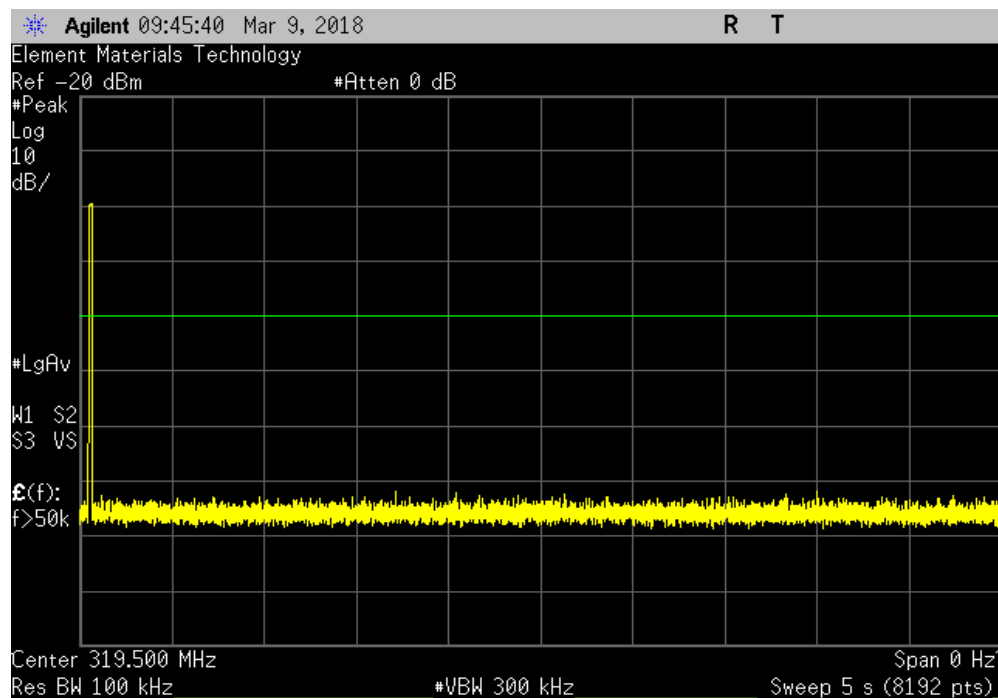


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1s Interval						
	Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result	
	N/A	N/A	N/A	N/A	N/A	



5s Interval						
	Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result	
	N/A	N/A	N/A	N/A	N/A	



DUTY CYCLE



XMM 2017.12.13

10s Interval						
	Pulse Width Type 1 (ms)	Pulse Width Type 2 (ms)	Pulse Width Type 3 (ms)	Limit	Result	
	N/A	N/A	N/A	N/A	N/A	

