Test Report # 317244 B

Equipment Under Test:	NRU1C
Test Date(s):	September 8, 15, 19, 20 2017
Prepared for:	**Geophysical Technology, Inc.** Attn: Andrew Sedlmayr 800 Mulberry Lane Bellaire, Texas 77401 USA

Report Issued by: Adam Alger, Quality Systems Engineer

Signature: Date: 11/03/2017

Report Reviewed by: Ryan Urness, Director of Test Services

Signature: Date: 10/9/17

Report Constructed by: Adam Alger, Quality Systems Engineer

Signature: Date: 10/09/2017

CONTENTS

Laird Technologies Test Services in Review

The Laird Technologies, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope
A2LA Certificate Number: 1255.01
Scope of accreditation includes all test methods listed herein, unless otherwise noted.

Federal Communications Commission (FCC) – USA

Accredited recognition of two 3 meter Semi-Anechoic Chambers

Accredited Test Firm Registration Number: 953492

Government of Canada

Innovation, Science and Economic Development Canada

ISED Site listing of two 3 meter Semi-Anechoic Chambers based on RSS-GEN – Issue 4
File Number: IC 3088A-2
File Number: IC 3088A-3

1 TEST REPORT SUMMARY

During **September 2017** the Equipment Under Test (EUT), **NRU1C**, as provided by **Geophysical Technology, Inc.** was tested to the following requirements:

Requirement	Description	Specification	Method	Compliant
15.519 (a)(1)	Cessation of transmission	10 seconds	Declared	Yes[1]
15.519 (a)(2)	UWB antenna location	Hand-held	Declared	Yes[2]
15.519 (b)	UWB bandwidth	3100-10600 MHz	ANSI C63.10	Yes
15.519 (c)	Radiated Emissions requirements above 960 MHz	-41.3 EIRP in dBm 3100-10600 MHz band	ANSI C63.10	Yes
15.519 (c)	Spurious Radiated Emissions below 960 MHz	FCC 15.209	ANSI C63.10	Yes
15.519 (d)	Radiated Emissions requirements 1164-1240 MHz and 1559-1610 MHz	-85.3 EIRP in dBm	ANSI C63.10	Yes
15.519 (e)	UWB Fundamental Peak level	0 dBm EIRP	ANSI C63.10	Yes
15.207	AC Power Line Conducted Emissions	0.150-30 MHz	ANSI C63.10	N/A[3]

Note 1: Declared and measured by manufacturer. Further documentation to support compliance provided in operational description exhibit.

Note 2: Declared by manufacturer and supported by filing exhibits.

Note 3: Not Applicable, manufacturer declared device does not transmit UWB while charging.

Notice:

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

2 CLIENT INFORMATION

Company Name	Geophysical Technology, Inc.
Contact Person	Andrew Sedlmayr
Address	800 Mulberry Lane Bellaire Texas 77401 USA

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	NRU1C
Model Number	NRU-1C
Serial Number	210000019
FCC ID	2AM2Z-NRU1C9G2Y1

2.2 Product Description

The NRU-1C is deployed in the field to record seismic data. It contains Bluetooth Low Energy and Ultra-Wide Band communication.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Additional Information

EUT powered by internal battery 4.2 VDC maximum

UWB operation programmed via BLE link to Android tablet running special test codes developed by manufacturer version NuSite Version 1.0.22.6 Android Version 7.0 (API 24).

3 REFERENCES

Publication	Date
CFR Title 47 Chapter I Subchapter A Part 15	2017
ANSI C63.10	2013
FCC KDB 393764 D01 V01	2015

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

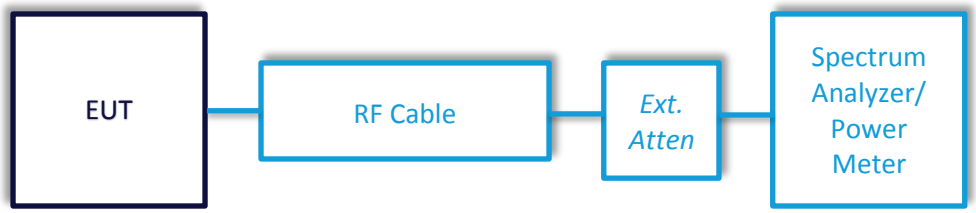
Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 Antenna Port Conducted Emissions

Operator	Adam Alger
QA	Khairul Aidi Zainal
Test Date	09/20/2017
Location	Radio bench
Temp. / R.H.	68/65
Requirement	FCC 15.519
Method	ANSI C63.10 Section 10

Limits:

Type	Limit
Peak Emission	-34 dBm EIRP
Average Emission	-41.3 dBm EIRP
UWB BW	500 MHz (-10 dB)

Test Parameters

RBW	1 MHz Fundamental / 1 kHz 15.519 (d)
Detector	Peak / RMS
EUT	Battery 4.2 VDC

Instrumentation

Smart Technology. Delivered.

Date : 21-Sep-2017 Test : Antenna Port Conducted Emissions Job : C-2809

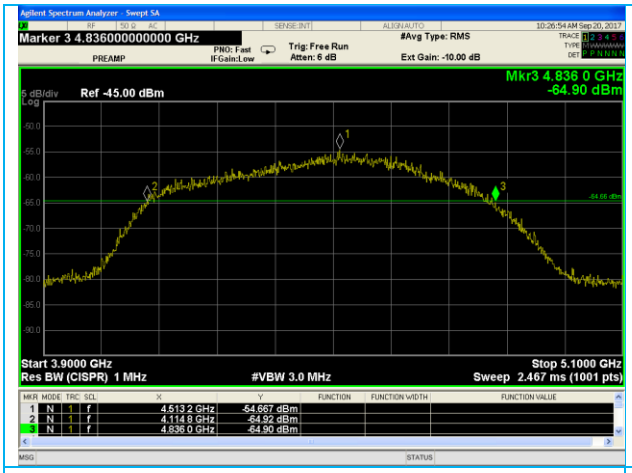
PE : Adam Alger Customer : GTI Quote : 317244

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration

Table – Bandwidth

Frequency	Frequency (GHz)	Bandwidth (MHz)
Fm	4.5132	721.2
FL	4.1148	
FH	4.8360	

Plots



Bandwidth and Peak Power

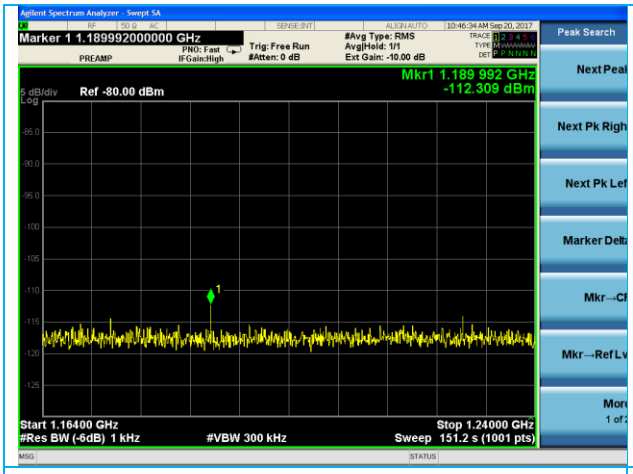
Average Power

Table – Power (Fm)

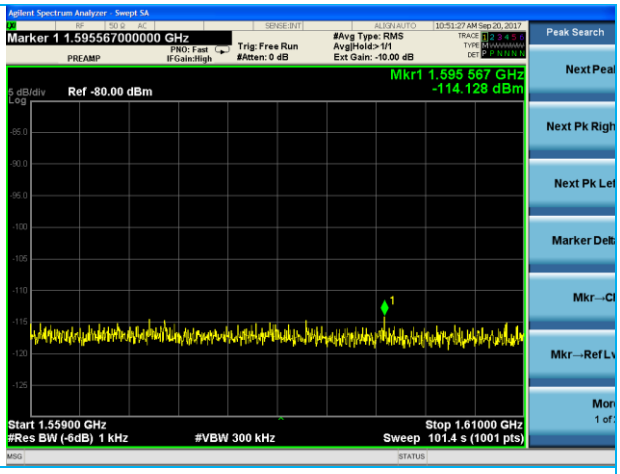
Frequency (GHz)	Level in RBW 1 MHz (dBm)	EIRP limit in 1 MHz	Margin (dB)	Type
4.513	-54.67	-34.0	20.7	Peak
4.524	-65.99	-41.3	24.7	Average

Note: Calculation of margin does not include antenna gain of EUT and is for reference only.

Plots – 15.519 (d) bands (for reference only)



1164-1240 MHz (EIRP limit -85.3 dBm)

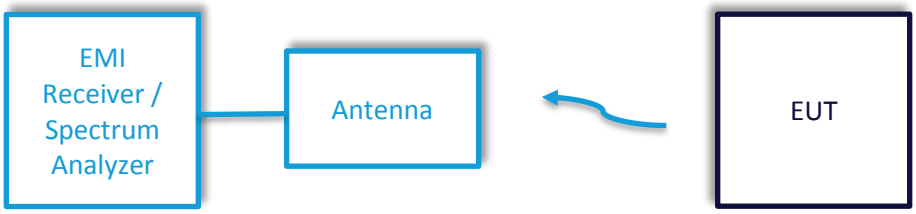


1559-1610 MHz (EIRP limit -85.3 dBm)

5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBµV/m) Margin (dB) = Limit (dBµV/m) - Corrected Reading (dBµV/m) Example at 4000 MHz: Reading = 40 dBµV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBµV/m Average Limit = 20 log (500) = 54 dBµV/m Margin = 54 dBµV/m - 50.8 dBµV/m = 3.2 dB

Block Diagram



5.2.1 Radiated Emissions

Operator	Adam Alger
QA	Coty Hammerer
Test Date	September 8,15,19 2017
Location	Chamber 3 < 1 GHz > Chamber 5
Temp. / R.H.	68-72/48-58
Requirement	FCC 15.209 & 15.519
Method	ANSI C63.10 Section 10, 6.3, 6.5, 6.6

Limits:

Frequency of emission (MHz)	Field strength (microvolts/meter)	Limit (dBµV/m) 3 meter	Limit Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	
216-960	200	46.0	

Average Limit

Frequency	EIRP dBm	(dBµV/m) @ 3m	(dBµV/m) @ 1m	(dBµV/m) @ 0.5m
960-1610	-75.3	20	29.54	35.56
1610-1990	-63.3	32	41.54	47.56
1990-3100	-61.3	34	43.54	49.56
3100-10600	-41.3	54	63.54	69.56
10600-40000	-61.3	34	43.54	49.56
1164-1240	-85.3	10	19.54	25.56
1559-1610	-85.3	10	19.54	25.56

Peak Limit

$$EIRP_{1\,MHz} = EIRP_{50\,MHz} + 20\log(1\,MHz/50\,MHz) = 0\,dBm + (-34\,dB) = -34\,dBm$$

E(dBµV/m) 3 meter = P (dBm EIRP) + 95.2

E(dBµV/m) 1 meter = -34 dBm + 95.2 +20*log(3/1) = 70.7

Test Parameters

Frequency	30-40000 MHz
Distance	1-meter 1-18 GHz; 0.5-meter 18-40 GHz
Measurement Settings: RBW	120 kHz < 1 GHz > 1 MHz (1 kHz for 15.519 (d)
Measurement Settings: VBW	1.2 MHz < 1 GHz > 3 MHz
Measurement Settings	Peak detector Max hold trace (reduced VBW for identification of emissions)
Measurement Settings: Final	Final Quasi-Peak < 1 GHz > Peak and Average (RMS) 15.521(d) RBW: 1 MHz, VBW 3 MHz Span: 100 MHz Detector: RMS Number of points: 1001 Sweep time: 1 ms
EUT	Continuous transmit
Notes	Tested in three orthogonal orientations, worst case reported Peak limit in 1 MHz RBW per ANSI C63.10 Section 10.3.6 Limit expressed in dBµV/m per ANSI C63.10 Section 10.3.9
Example Calculation	Limit @ 1m (E) dBµV/m = EIRP (dBm) + 95.3 + 20*log (3m/1m) Limit @ 0.5 (E) dBµV/m = EIRP (dBm) + 95.3 + 20*log (3m/0.5m)

Instrumentation

Laird
Smart Technology. Delivered.

Date : 19-Sep-2017 Test : Radiated Emissions Job : C-2809

PE : Adam Alger Customer : GTI Quote : 317244

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration
2	AA 960128	Biconical Antenna	ETS Lindgren	3110B	00062899	4/13/2017	4/13/2018	Active Calibration
3	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	4/17/2017	4/17/2018	Active Calibration
4	EE 960085	EMI Receiver	Agilent	N9038A	MY51210148	5/12/2017	5/12/2018	Active Calibration
5	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	10/13/2016	10/13/2017	Active Calibration
6	EE 960159	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	462101702	4/12/2017	4/12/2018	Active Calibration
7	AA 960153	High Pass Filter 2.4 GHz	KWM	HPF-L-14186	7272-04	5/2/2017	5/2/2018	Active Calibration
8	AA 960171	Cable - low loss 6m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	11/21/2017	Active Verification
9	AA 960174	Small Horn Antenna	ETS Lindgren	3116C-PA	00206880	5/1/2017	5/1/2018	Active Calibration
10	AA 960162	EM Series Cable	MegaPhase	EM26-S1S1-120	12024301 001	6/29/2016	11/11/2017	Active Verification
11	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration

Table 30-1000 MHz (limit and test distance of 3 meter)

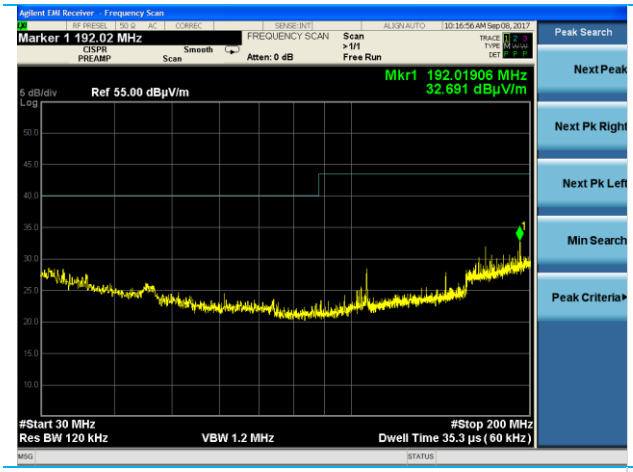
Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Quasi Peak Reading (dBµV/m)	Quasi Peak Limit (dBµV/m)	Margin (dB)
192.0	Vertical	100	360	33.55	29.66	43.5	13.8
106.0	Horizontal	159	0	30.39	25.50	43.5	18.0
319.0	Horizontal	200	73	29.33	27.56	46.0	18.4
352.2	Vertical	136	228	44.13	42.86	46.0	3.1
368.6	Vertical	135	216	45.03	43.91	46.0	2.1
385.0	Vertical	135	230	44.66	43.67	46.0	2.3
319.5	Vertical	135	165	44.47	43.14	46.0	2.9
499.7	Vertical	100	261	43.83	42.78	46.0	3.2
499.7	Horizontal	172	208	39.57	37.92	46.0	8.1
100.0	Vertical	100	216	44.36	39.52	43.5	4.0
176.8	Horizontal	100	208	44.91	38.67	43.5	4.8
368.0	Horizontal	100	190	45.93	44.80	46.0	1.2
385.0	Horizontal	100	0	46.67	45.62	46.0	0.4
319.5	Horizontal	100	190	46.44	45.42	46.0	0.6
352.2	Horizontal	100	0	45.36	44.29	46.0	1.7
532.5	Horizontal	159	183	45.38	44.36	46.0	1.6

Table 1000-18000 MHz (limit and test distance of 1 meter)

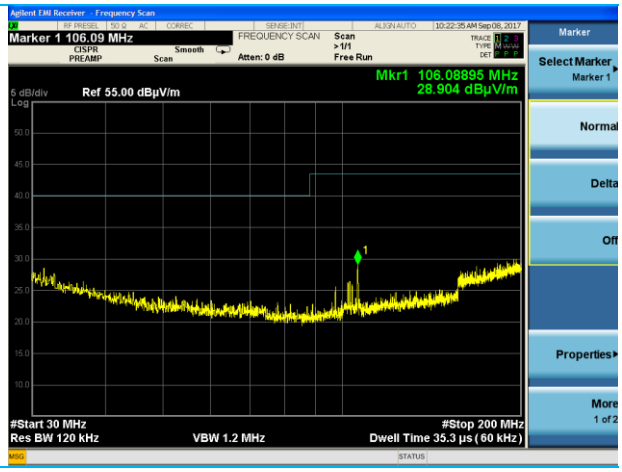
Frequency (MHz)	EUT orientation	Antenna Polarity	Azimuth (degree)	Height (cm)	Average Reading (dBµV/m)	Peak Reading (dBµV/m)	Avg Limit (dBµV/m)	Avg Margin (dB)	Peak Limit (dBµV/m)	Peak Margin (dB)
4264	Horizontal	Horizontal	272	154	35.23	44.78	63.5	28.3	70.7	25.9
8959	Horizontal	Horizontal	111	156	32.88	44.60	63.5	30.6	-	-
2239	Horizontal	Horizontal	13	155	31.74	44.34	43.5	11.8	-	-

Note: No emissions observed above system noise floor at 0.5 meter test distance 18-40 GHz

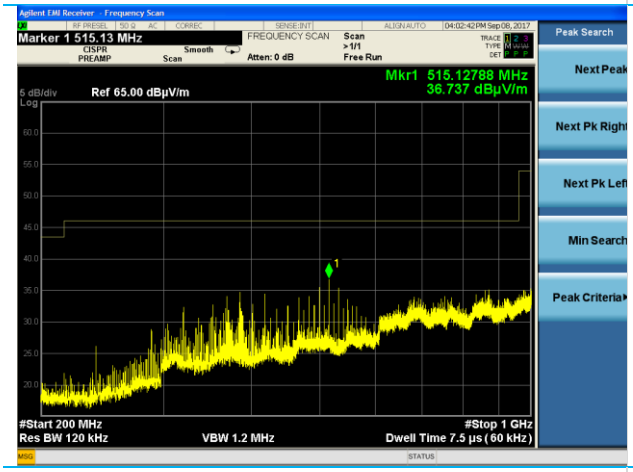
Plots (3-meter test distance) – Emissions consistent between all EUT modes of operation



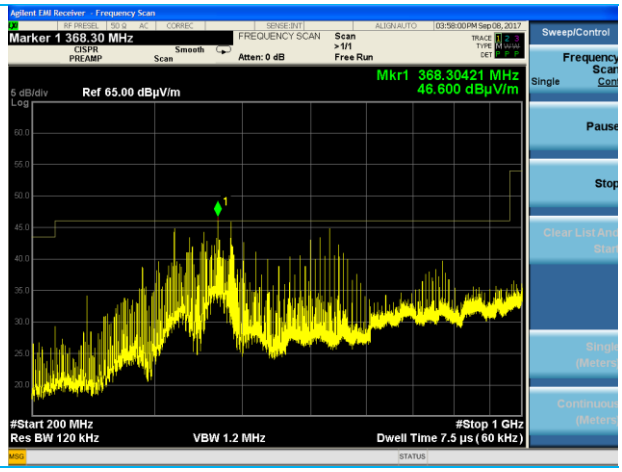
30-200 MHz Vertical



30-200 MHz Horizontal

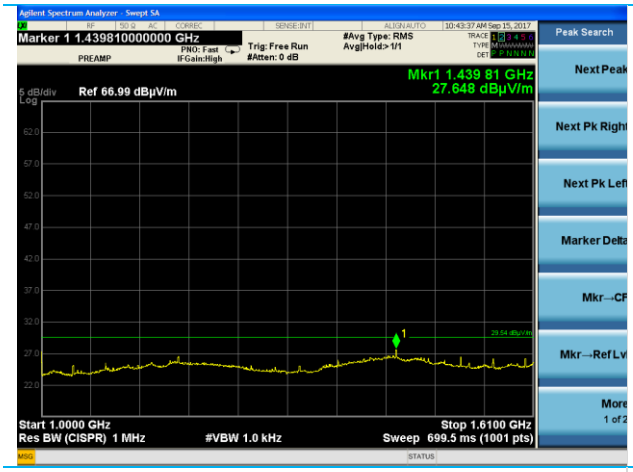


200-1000 MHz Vertical

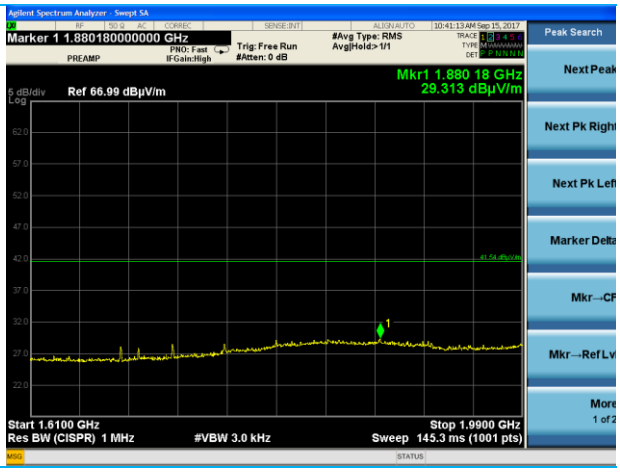


200-1000 MHz Horizontal

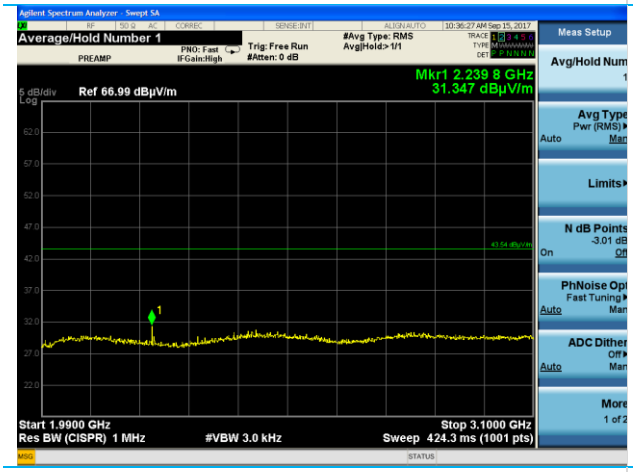
Plots (1-meter test distance)



1-1.61 GHz

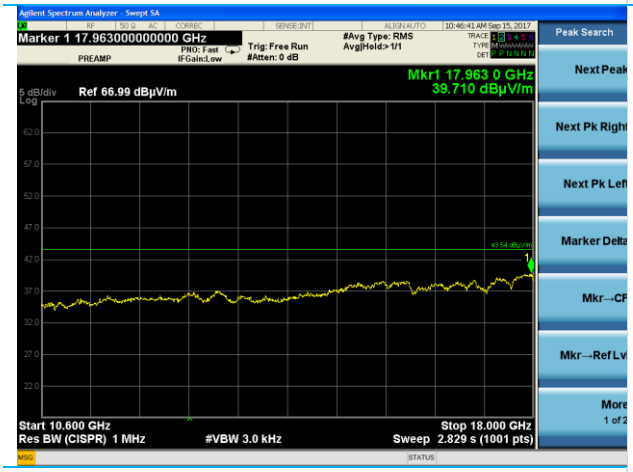


1.61-1.99 GHz



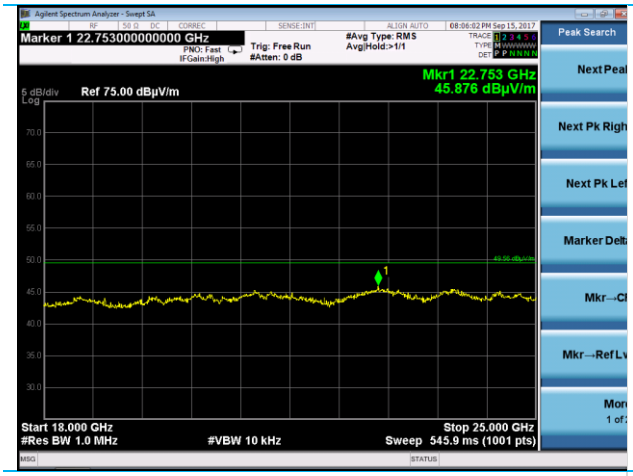
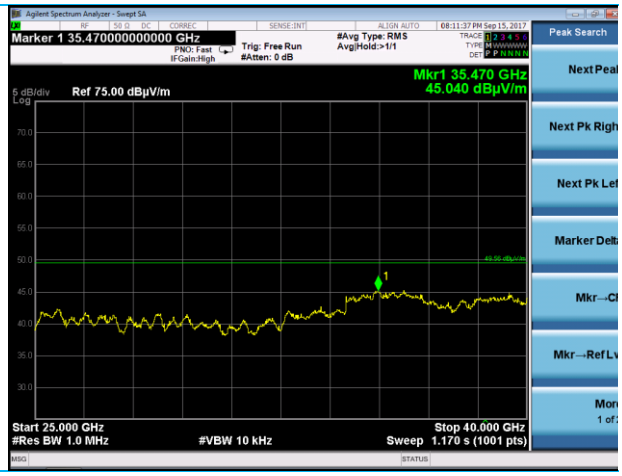
1.99-3.1 GHz

3100-10600 MHz



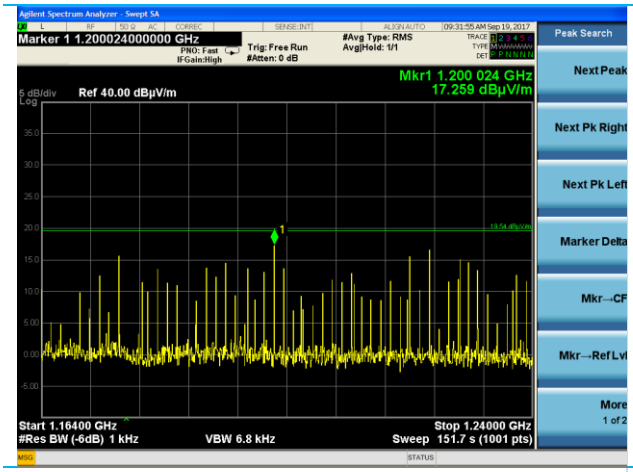
10.6-18 GHz

Plots (0.5-meter test distance)

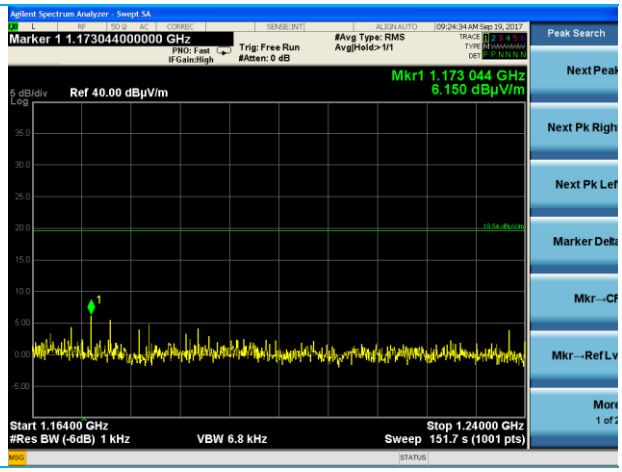
	
18-25 GHz	25-40 GHz

Plots 15.519 (d) – 1-meter test distance, RBW 1 kHz
Emissions not related to UWB transmission – No change when UWB disabled
EUT tested in both vertical and horizontal polarizations

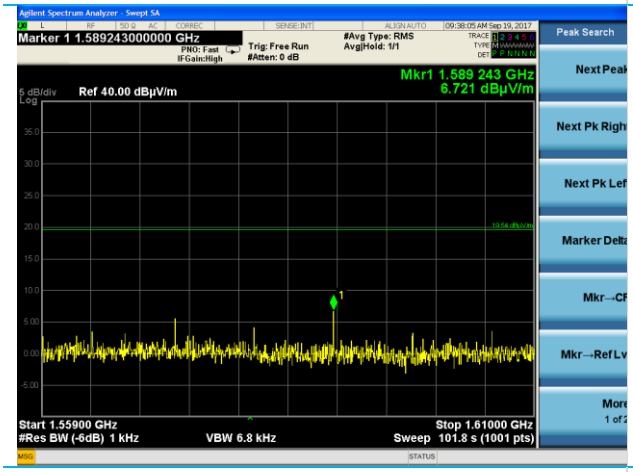
Frequency (MHz)	EUT orientation	Antenna Polarity	Azimuth (degree)	Height (cm)	Average Reading (dBµV/m)	Peak Reading (dBµV/m)	Avg Limit (dBµV/m)	Avg Margin (dB)
1173	Vertical	Horizontal	110	100	4.42	7.26	19.5	15.1
1200	Vertical	Vertical	64	100	13.65	17.26	19.5	5.9
1589	Vertical	Vertical	254	100	12.37	15.38	19.5	7.2



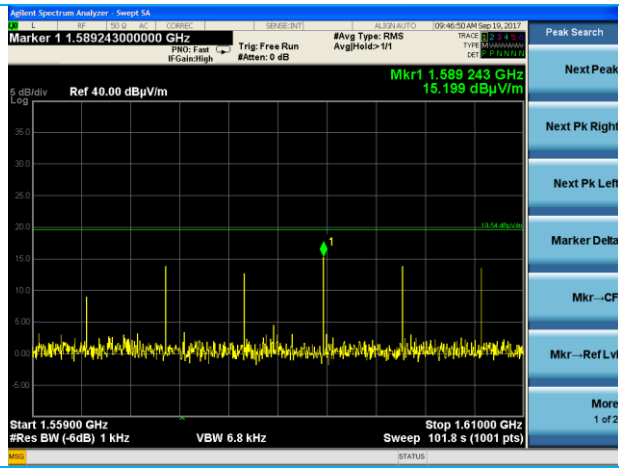
1.164-1.240 GHz Vertical



1.164-1.240 GHz Horizontal



1.559-1.610 GHz Vertical



1.559-1.610 GHz Horizontal

6 KDB 393764 DO1 UWB FAQ v01

Question 1: What constitutes the bandwidth of a UWB emission for devices operating under Part 15 Subpart F?
Answer 1: Section 15.503(a) defines the UWB bandwidth as "… *the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated* f_H *and the lower boundary is designated* f_L*. The frequency at which the highest radiated emission occurs is designated* f_M*.*"
Compliance 1: Section 5.1.1 of the report shows 10 dB bandwidth. Note the fundamental measurement as measured radiated at 1 meter test distance is significantly lower than limit and did not create enough dynamic range to accurately measure 10 dB below highest point. EUT UWB antenna constructed in a 50-ohm impedance and fitted with a temporary connector for measurement.

Question 2: How is the UWB emission bandwidth determined?
Answer 2: Standardized procedures for measuring the UWB bandwidth to demonstrate compliance to the rule requirements can be found in 10.1 of ANSI C63.10-2013. In those cases where the measured emission spectrum contains multiple (more than two) -10 dB points, the outermost points are to be used to define the UWB bandwidth (*i.e.,* the widest bandwidth is assumed).
Compliance 2: ANSI C63.10-2013 used and referenced throughout report.

Question 3: What portion of the UWB emission spectrum is required to be within the authorized frequency bands? Is it adequate for just the center frequency to be within the authorized band?
Answer 3: For a UWB emission spectrum, the entire fundamental bandwidth (that portion of the spectrum between the outermost -10 dB points) must be contained within the authorized frequency band. Consequently, it is not adequate that just the UWB center frequency be within the authorized frequency band. For example, the emissions spectrum from a ground penetrating radar (GPR) applying for authorization under Section 15.509 must have its fundamental bandwidth located below 960 MHz.
Compliance 3: Confirmed UWB emission contained in the 3100-10600 MHz band.

Question 4: Can a device be certified under the UWB rules if its emission bandwidth resides outside of the frequency bands identified for each UWB application but all associated emissions are below the prescribed limits?
Answer 4: The UWB rules permit limited UWB applications, and designate the authorized frequency range(s) over which the UWB bandwidth must be fully contained on an application-specific basis. UWB operations outside of the frequency ranges authorized for a particular UWB application are not permitted under the rules.
Compliance 4: Confirmed UWB emission contained in the 3100-10600 MHz band.

Question 5: How are the emissions limits to be applied in determining compliance of a UWB device?
Answer 5: In each rule section pertaining to specific UWB applications, a table is provided that lists the emission limit applicable within each frequency band. The device under test must comply with all applicable limits accounting for all specified frequency bands. Standardized procedures for measuring UWB emissions to demonstrate compliance to the rule requirements are provided in Clause 10 of ANSI C63.10-2013.
Compliance 5: Rule Part 15.519 demonstrated compliance using ANSI C63.10-2013

Question 6: Is any specialized test equipment necessary for performing UWB compliance measurements?
Answer 6: A spectrum analyzer with a quasi-peak detector is required for measuring UWB emissions below 960 MHz to verify compliance with the emissions limits in that portion of the spectrum. An analyzer with a true RMS detector is preferred for measuring UWB emission power above 960 MHz. If an RMS (power averaging) detector is not available, then the following alternative can be used to measure the true RMS level with a spectrum analyzer that does not incorporate a RMS detector. This approach requires a multiple step technique beginning with a peak detection scan of the UWB spectrum, using a resolution bandwidth (RBW) of 1 MHz and a video bandwidth (VBW) of no less than 1 MHz. The resulting trace is to be used to identify the frequency and bandwidth of the five highest peaks in the spectrum. The analyzer is then to be placed in a "zero span" mode, with a RBW of 1 MHz, a VBW equal to or greater than 1 MHz, and a detector selected that does not distort or smooth the instantaneous signal levels (*e.g.,* a "sample" detector). With these settings, a minimum of 10 independent instantaneous points, representing the highest amplitude readings, are to be obtained during the time that a pulse is present, in each 1 MHz frequency bin across the bandwidth of each of the five highest peaks identified in the preceding step. Note that when the pulse repetition frequency (PRF) of the device under test is less than the 1 MHz RBW, a significant number of samples may be required to ensure that a minimum of 10 samples with the pulse present are obtained. The data obtained from these measurements must then be post-processed to determine the true RMS average power levels. The post-processing of the data can be performed manually or with the aid of appropriate software.
A low-noise preamplifier will be required to measure emissions to the levels necessary to determine compliance with those limits specified in the frequency band 960 MHz to 1610 MHz for some UWB applications (*e.g.,* indoor UWB devices authorized under Section 15.517). If the radiated measurements are not performed in an anechoic chamber, then the use of a preamplifier may also necessitate that a preselect filter be inserted ahead of the preamplifier to prevent saturation from strong ambient RF signals.
Compliance 6: Laird Technologies, Inc. lab is ISO 17025 accredited and recognized by FCC. CISPR 16-1-1 compliant EMI Receiver with Quasi-peak and RMS detectors utilized for measurement with low noise preamplifiers calibrated with broadband double-ridge horn antennas for measurement of UWB signals.

Question 7: What compliance information should be included with an application for certification?
Answer 7: At a minimum, the following information is required for processing of a UWB application for certification:

- The UWB application category (*e.g.,* imaging device, indoor system, handheld device), and the applicable rule section.
- The lower and upper -10 dB frequencies (f_L and f_H, respectively) and the frequency of the maximum observed emission level (f_M).
- A description of the procedure used to determine the UWB bandwidth.
- The maximum radiated emissions (including narrowband emissions) and the associated frequencies observed in each frequency band identified in the applicable emission limits tables.
- In the event that no emissions are observed in the aforementioned frequency bands, report the minimum sensitivity (noise floor) of the measurement system in these bands (*i.e.,* show that the measurement system is capable of detecting emissions down to the level dictated by the applicable emissions limit).
- A complete description of the measurement system, including antenna, preamplifier, etc. This should include information such as antenna gain/factor, preamplifier noise figure and gain, particularly at each frequency for which a data point is provided (peak emission frequency, -10 dB points, etc.).
- Calibration information for the measurement system at each frequency for which a data point is reported.
- If applicable, report all digital circuitry emissions exceeding the applicable UWB limits, and provide a complete description of the process used to justify invoking the exception stated in Section 15.521(c).
- A description of the technique used to determine RMS average emission levels.
- A description of the test site used, specifying whether the measurements were performed in a test chamber, outdoor test site, with or without a ground plane floor, and any other pertinent information.
- Where applicable, indicate the presence of required operating labels and/or a manual disable switch.
- Describe the pulse characteristics (PRF, pulse width, etc.). Is the pulse pseudo random (dithered) or periodic? Providing an oscilloscope plot can be helpful.
- Supporting photographs depicting the measurement system set-up and the device under test.

Compliance 7: Items for application found in test report and associated documentation provided by applicant.

Question 8: What type of measurement antenna should be used for performing radiated emissions measurements on UWB devices when assessing compliance to the UWB rules?
Answer 8: Multiple measurement antennas will likely be necessary for performing these tests, each optimized over a distinct frequency range. See Clause 10 of ANSI C63.10-2013 for additional guidance on performing UWB compliance measurements.
Compliance 8: See equipment list in test report for specific antenna information. Biconical antenna 30-200 MHz, Log-periodic dipole array 200-1000 MHz, Double ridge horn 1-18 GHz, Small double ridge horn 18-40 GHz.

Question 9: Is there a provision for operating wireless tank level gauges (*e.g.*, level-probing radar) under the UWB rules?
Answer 9: Section 15.517(a)(4) authorizes the use of tank level gauges as indoor UWB devices only if they are used within metal or underground storage tanks, and the emissions are directed downward.
Compliance 9: Not applicable to this device.

Question 10: Are there standard measurement procedures available for use in demonstrating compliance of a UWB device to the applicable FCC Rules?
Answer 10: Clause 10 of ANSI C63.10-2013 provides standardized measurement procedures for acquiring the requisite data to demonstrate that an ultra-wideband device conforms to the applicable FCC rules.
Compliance 10: ANSI C63.10-2013 demonstrated throughout test report.

7 REVISION HISTORY

Version	Date	Notes	Person
V0	10/09/2017	Initial Draft	Adam Alger
V1	10/10/2017	Final Release	Adam Alger
V2	10/25/2017	TCB Comments	Adam Alger
V3	11/03/2017	Remove 15.519 data to be put in Theory of Operation	Adam Alger

END OF REPORT