

Test Report No. PR046489 Rev. – Page 1 of 99

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Date: 25 May 2016

Customer: Getac Inc. 400 Exchange Suite 100 Irvine, CA 92602 Purchase Order Number: PO#03211601

A.	TESTS:	Hero Emissions (RE102)
В.	TEST ITEMS:	Two (2) Tablets, P/N F110 S/N's RF539F0595, RF539F0597 One (1) Tablet RX10 S/N RG139R0076
C.	SPECIFICATIONS:	 MIL-STD-461F ANSI NCSL Z540-1 ISO 17025:2005

D. RESULTS:

This is to certify that the Tablets were subjected to the above tests according to the above specifications.

See pages 7-10 for Summary of Test Results.

The Tablets were returned to Getac Inc. for further evaluation.

Test data, an equipment list, and photographs are attached.

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Steve Samplés,

Preparer

ames Grosik.

Program Manager

Stephan Samples, Quality Assurance Manager

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REVISION SUMMARY

Revision	Date	Affected Page (s)	Affected Paragraph (s)
Initial Release	25 May 2016	N/A	N/A

Note: Paragraphs affected by revisions are indicated by a superscript of the revision number appearing just after the paragraph title in the body of the report. Due to the revisions, some items may change pages.





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TEST CONCEPT STATEMENT

After reviewing several reports pertinent to hazards of electromagnetic radiation to ordnance safety, the following method was developed to ensure both the repeatability and technical accuracy of the measurements.

It was determined that the measurement technique should be as close as practicable to the standard procedures outlined in MIL STD. 461E and later revisions in the interest of measurement repeatability, basic technical understanding and, scientific measurement validity. The basis for this is the fact that the inverse square law relationship between, in this case, far field measurements made at the one meter distance with the test object orientated to produce the maximum signal strength in the measurement receiver can be accurately extrapolated down to a near field boundary of $\Box/2\pi$ since the 20 dB per decade slope verses distance extends to $\lambda/10$ with roughly 5% measurement precision. The only deviation to standard MIL-STD-461 procedures was that the test article's maximum radiation orientation was pre-determined by utilizing a broad band free field probe as a detector for all the different modes of transmit mode was used to position the test article in order to insure that the maximum possible level was obtained and ((dB_µV/m)-120)/20).



A word of caution is in order regarding the utilization of field measurements and antenna gain to derive potential hazard and non-hazard conditions. The derivations I reviewed did not take into account the total available transmitter output power as a limiting factor and the field strength boundary curve doesn't seem to have any relationship to physical reality over much of its curve. A typical military initiator has a No Fire rating of 1A and an All Fire range exceeding 3A with a typical bridge wire resistance, when cold, of 1 Ohm. By Ohm's law this means that the initiator can dissipate one (1) Watt continuously without firing, and can fire somewhere above one (1) Watt, and will fire above three (3) Watts. This means that a one (1) Watt transmitter cannot fire ordnance regardless of antenna gain or transmit frequency. There is no relationship between free field strength and coupled power. In other words, even if I generate a 100 V/m field strength with a one Watt transmitter and a high gain antenna (it's easily done), I can't couple one Watt into the initiator without invoking 100% efficiency. Interestingly, automobile initiators (air bag) generally use one (1) Watt as the All Fire condition. This is about 5 dB lower than the military requirement. This in itself is an important safety factor for ordnance. The difficulty with the HERO curve is the fact that at its low point, the safe no hazard boundary is 0.5 V/m (0.00066 Watts/m²) between 2 MHz and roughly 80 MHz. We have to put the E-field probe in the anechoic chamber to achieve those low levels! Indeed, a lightning strike several miles away will generate radio static orders of magnitude greater than 0.5 V/m starting well below 2 MHz and extending to well over 100 MHz. A solar burst can also achieve levels much higher than 0.5 V/m over the entire earth and with an even wider bandwidth.

Although this isn't a factor in this application, a realistic specification should be undertaken in order to make it useful in the future. At the very least, the total available power from a device and the inability to couple that power efficiently to ordnance should be recognized as a limiting factor in any calculation of safety margin as a first principle approach.

Jim Vogler, PhD.



SAFE DISTANCE CALCULATIONS

Safe distance calculations

The safe distance calculation is derived by invoking the inverse square law relationship. Specifically, the measured level is compared to HERO limit level and difference, in dB, is obtained by subtraction. The difference, in dB, is then used to calculate the distance to the test article that would intersect the HERO limit. The formula is distance*antilog (dB/20). The distance in our test was 1 meter in all cases, and the level was always below the HERO limit, making the dB difference always a negative number. The justification for this approach comes directly from proven antenna theory, (Ref. 1-4).

1) Harold A. Wheeler, "Fundamental Limitations of Small Antennas", Proc. IRE, 35, (1947), pp. 1479-1484

2) John Krause, Antennas, McGraw-Hill, 1950

3) Charles Capps, "Near Field or Far Field", EDN, August 16, 2001, pp. 95-102.

4) Hans Gregory Schantz, "A Near Field Propagation Law and A Novel Fundamental Limit to Antenna Gain Versus Size", IEEE APS Conference July 2004



SUMMARY OF TEST RESULTS

Hero Emissions (RE102) Test

Specification / Reference:

Document: MIL-STD-461F

Test Items: Tablets P/N F110 S/N's RF539F0595 (AT&T), RF539F0597 (Verizon)

Date Started: 11 April 2016

Date Completed: 22 April 2016

Test Summary:

The Tablets were subjected to the Hero Emissions (RE102) in accordance with MIL-STD-461F, with reference to HERO emissions. The purpose of testing was to verify that the F110 Rugged Tablet with the integrated GOBI firmware can be operated safely.

The measurement equipment was configured according to the RE102 Test Procedure. The equipment was calibrated in accordance with the requirements of MIL-STD-461F for radiated emissions testing. Receiver antenna was placed one (1) meter distant from the radiation source (test article).

The following steps layout the testing of the Tablets:

- 1. Place the tablet inside the test chamber.
- 2. Verify the F110 Tablet was connected to 4G via the home screen. Enable Skype[™].
- 3. Confirm strongest broadcast signal from test subject. Use this orientation for the remaining testing.
- 4. Conduct a HERO scan to verify that the F110 tablets were operating on the 4G signal only (via Skype).
- 5. Conduct 4G cellular scans (as required) for GOBI firmware, primary and backup.

During the exposure, a Low Pass Filter (LPF) was used to force the F110 tablet to connect to the 700 MHz frequency band when needed. An additional scan was performed using a Band Pass Filter (BPF) to force the F110 tablet to connect to the 1900MHz frequency band when needed. Scan results are noted in Table 1.

Test Results:

No physical anomalies were noted. Reference: Test Logs and photographs for additional test detail.



F110 Tablet Mode & Polarity	Frequency (MHz)	Measured RE102 dBuV/m	Converted to HERO V/m	≈dB Below HERO Spec	Calculated Safe Distance (in)	Effective Safe Distance (in)
Verizon 4G/LTE Primary Vertical Edge 4	783.94	113.7	0.48	-20.1	3.89"	0"
Verizon 4G/LTE Backup Vertical Edge 4	786.75	110.9	0.35	-22.9	2.82"	0"
AT&T 4G/LTE Primary Vertical Edge 4	709.32	98.2	0.08	-34.7	0.72"	0"
AT&T 4G/LTE Backup Vertical Edge 4	1893.2	101.6	0.12	-39.8	0.40"	0"
LPF (700MHz) AT&T 4G/LTE Primary Vertical Edge 4	708.96	101.3	0.12	-31.6	1.03"	0"
LPF (700 MHz) AT&T 4G/LTE Backup Vertical Edge 4	707.88	97.7	0.08	-35.2	0.68"	0"
BPF (1900 MHz) AT&T 4G/LTE Primary Vertical Edge 4	1891.1	108.7	0.27	-32.7	0.92"	0"

Results Summary Tables RE102 / HERO Testing (F110)

Table 1

Note: The Practical (Effective) Safe Distance between the Tablet and any ordinance is 0" because the antenna elements for the Tablet are internal.



Hero Emissions (RE102) Test

Specification / Reference:

Document: MIL-STD-461F

Test Items: Tablet P/N RX10 S/N RG139R0076

Date Started: 13 April 2016

Date Completed: 10 May 2016

Test Summary:

The Tablet was subjected to the Hero Emissions (RE102) in accordance with MIL-STD-461F, with reference to HERO emissions. The purpose of testing was to verify that the RX10 Rugged Tablet can operate safely.

The measurement equipment was configured according to the RE102 Test Procedure. The equipment was calibrated in accordance with the requirements of MIL-STD-461F for radiated emissions testing. Receiver antenna was placed one (1) meter distant from the radiation source (test article).

The following steps layout the testing of the Tablets:

- 1. Place the tablet inside the test chamber.
- 2. Verify the RX10 Tablet was connected using the home screen. Enable Skype[™].
- 3. Confirm strongest broadcast signal from test subject. Use this orientation for the remaining testing.
- 4. Conduct a HERO scan to verify that the RX10 tablet was operating on the Wi-Fi, 3G or 4G/LTE signal (via Skype).
- 5. Conduct Wi-Fi and cellular scans.

Scan results are noted in Table 2.

Test Results:

No physical anomalies were noted. Reference: Test Logs and photographs for additional test detail.



RX10 Mode & Polarity	Frequency (MHz)	Measured RE102 dBuV/m	Converted to HERO V/m	≈dB Below HERO Spec	Calculated Safe Distance (in)	Effective Safe Distance (in)
Verizon (Full Power) 3G Vertical Edge 3	842.43	99	0.09	-35.4	0.67"	0"
Verizon (Full Power) 4G/LTE Vertical Edge 3	783.54	103.2	0.14	-30.6	1.16"	0"
Verizon (Full Power) 4G/LTE Vertical Edge 3	1723.9	106.8	0.22	-33.8	0.80"	0"
AT&T (Full Power) 3G Vertical Edge 3	1908.6	123.2	1.45	-18.3	4.79"	0"
AT&T (Full Power) 4G/LTE Vertical Edge 3	709.69	121.4	1.17	-11.5	10.48"	0"
AT&T (Full Power) 4G/LTE Vertical Edge 3	1908.3	119.5	0.94	-22.0	3.13"	0"
802.11b 2.4GHz Vertical Edge 4	2464.4	113.7	0.48	-30.0	1.24"	0"
802.11g 2.4GHz Vertical Edge 4	2459.1	110.2	0.32	-33.5	0.83"	0"
802.11n 2.4GHz Vertical Edge 4	2463.8	110	0.32	-33.7	0.81"	0"
802.11a 5GHz Vertical Edge 4	5748.6	106.9	0.22	-44.1	0.25"	0"
802.11n 5GHz Vertical Edge 4	5747.6	107.1	0.23	-43.9	0.25"	0"
802.11ac 5GHz Vertical Edge 4	5747.6	106.4	0.21	-44.6	0.23"	0"

Results Summary Tables RE102 / HERO Testing (RX10)

Table 2

Note: The Practical (Effective) Safe Distance between the Tablet and any ordinance is 0" because the antenna elements for the Tablet are internal.



FACTUAL DATA



Customer			Project Number: PR046489		
Test Item:	*****		Log Start Date: 4/11/2016		
Model P/N	J: 526287	07000P	Standard: MIL-STD-461F (Ref to HI	ERO)	
<u>S/N: RF53</u>	9F0595 (AT&T); F	RF539F0597 (Verizon) Test: RE102		
Temp: 21.	2°C		Humidity: 43%		
Date	Start Time	Finish Time	NOTES	Result	Ini
· · · · · ·			All measurements were done with the receiving antenna		
			1m back from the F110. Skype was used to drive		·
			the F110 during the measurement(s).	-	
			AT&T and Verizon 4G/LTE Cellular Testing using both the Primary and Backup GOBI Firmware.		
			Verizon Primary GOBI Firmware		
4/11/16	0930			Pass	JG
4/11/16		1130	Verizon Backup GOBI Firmware	Pass	JG
4/13/16	0630		AT&T Primary GOBI Firmware	Pass	JG
4/13/16		0830	AT&T Backup GOBI Firmware	Pass	JG
4/14/16	1100		Additional scans were conducted using a LPF to force the F110 to connect to the 700MHz Frequency Band only		
		-	AT&T Primary GOBI Firmware	Pass	JG
4/14/16		1330	AT&T Backup GOBI Firmware	Pass	JG
4/22/16			An additional scan was conducted using a BPF to force the F110 to connect to the 1900MHz Frequency Band only		
4/22/16	730	815	AT&T Primary GOBI Firmware	Pass	JC
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RE102/HERO Testing

PR046489

F110 Tablet Mode and Polarity	Frequency (MHz)	Measured RE102 dBuV/m	Converted HERO V/m	dB Below HERO Spec	Calculated Safe Distance	Effective Safe Distance
Verizon 4G/LTE Primary Vert Edge 4	783.94	113.7	0.48	-20.1	3.89"	0"
Verizon 4G/LTE Backup Vert Edge 4	786.75	110.9	0.35	-22.9	2.82"	0"
AT&T 4G/LTE Primary Vert Edge 4	709.32	98.2	0.08	-34.7	0.72"	0"
AT&T 4G/LTE Backup Vert Edge 4	1893.2	101.6	0.12	-39.8	0.40"	0"
*AT&T 4G/LTE Primary Vert Edge 4	708.96	101.3	0.12	-31.6	1.03"	0"
*AT&T 4G/LTE Backup Vert Edge 4	707.88	97.7	0.08	-35.2	0.68"	0"
**AT&T 4G/LTE Primary Vert Edge 4	1891.1	108.7	0.27	-32.7	0.92"	0"

Note: The Practical (Effective) Safe Distance between the F110 and any ordinance is 0" because the antenna elements for the F110 are internal.

*Conducted with a LPF to force the F110 to connect to the 700MHz Frequency Band only.

** Conducted with a BPF to force the F110 to connect to the 1900MHz Frequency Band only.

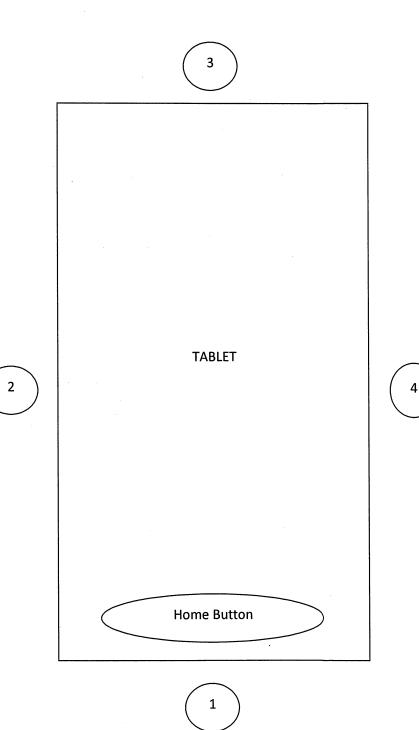
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F110 Tablet					
Mode (Frequency)	Verizon (frequency/band)	Complete			
AT&T 4G/LTE	700MHz (band 17, block B/C) 1900MHz (band 2)	x			
Verizon 4G/LTE	700MHz (band 13, block C)	X			

Getac Inc

F110 Tablet Position of Highest Radiation				
Tablet	AT&T 4G/LTE	Verizon 4G/LTE		
F110	Vertical – Edge 4	Vertical – Edge 4		



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		F110 PN 52628707000 SN RF539F0597 Veriz Primary Firmware Ve	zon 4G/LTE
160	Nuclear Unsafe		
	HERO SAFE 2-1		
140			
	HERO UNSAFE 2-2		
120			
4.0.0			
100			
600		REQUENCY [MHz]	1000

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1. MIL-STD 461E setups

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1.40 RE-102 HERO Nuclear 600MHz-1GHz

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Peaks above -45 dB of Limit Line #2 peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV/m)	DELTA
1	783.94	113.7	-32.1
2 3	781.55 777.96	111.3 110.4	-32.1 -34.4 -35.3

Test Report Mo. PR046489 EMI-TEST 11 Apr 2016 10:18:08 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz Peaks above -45 dB of Limit Line #3 peak criteria = 6 dB FREQ (MHz) 783.94 PEAK# (dBuV/m) DELTA 1 113.7 -42.8

EMI-TEST 11 Apr 2016 11: 15: 19 EMISSION LEVEL [dBuV/m] PEAK 180 RE-102 HERO Nuclear 600MHz-1GHz Getac Inc PR046489 F110 PN 52628707000P SN RF539F0597 Verizon 4G/LTE Secondary Firmware Vert Side 4 160 Nuclear Unsafe HERO SAFE 2-1 140 HERO UNSAFE 2-2 120 100 1000

FREQUENCY [MHz]

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	PEAK# 1 2 3 4	FREQ (MHz) 786.75 777.96 779.95 775.59	(dBuV/m) 110.9 109 107.7 94.6	DELTA -22.9 -24.7 -26.0 -39.1		

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1. MIL-STD 461E setups

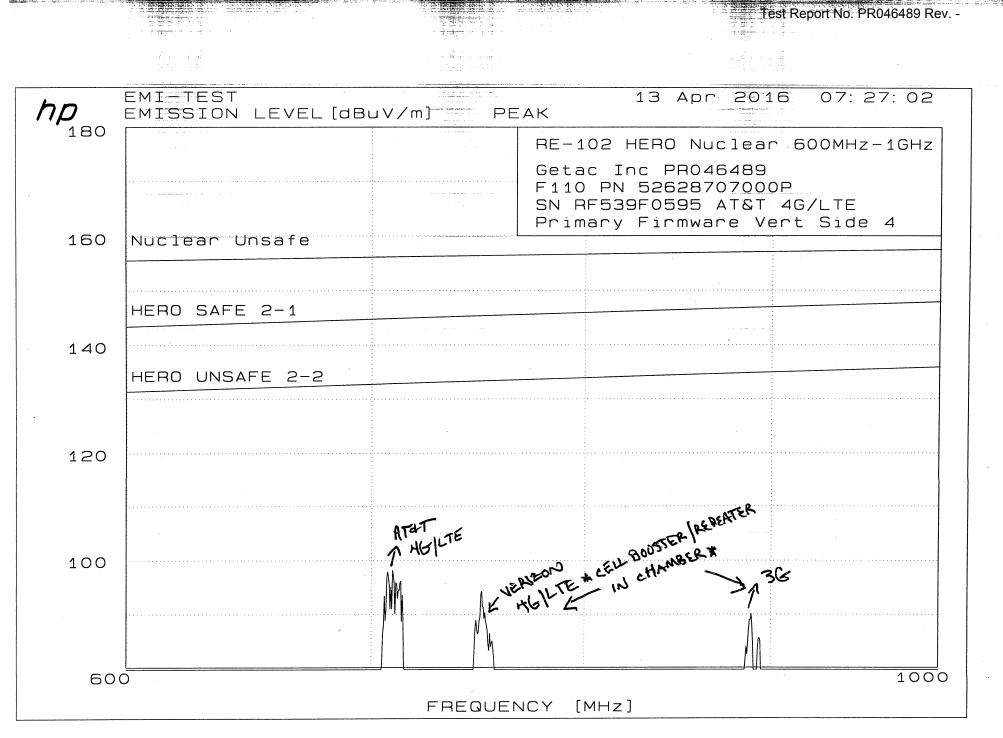
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1.40 RE-102 HERO Nuclear 600MHz-1GHz

Peaks above -50 dB of Limit Line #2
 peak criteria = 6 dB

PEAK# 1	FREQ (MHz) 786.75	(dBuV/m) 110.9	DELTA -34.9
2	777.96	109	-34.9
3	779.95	107.7	-38.0

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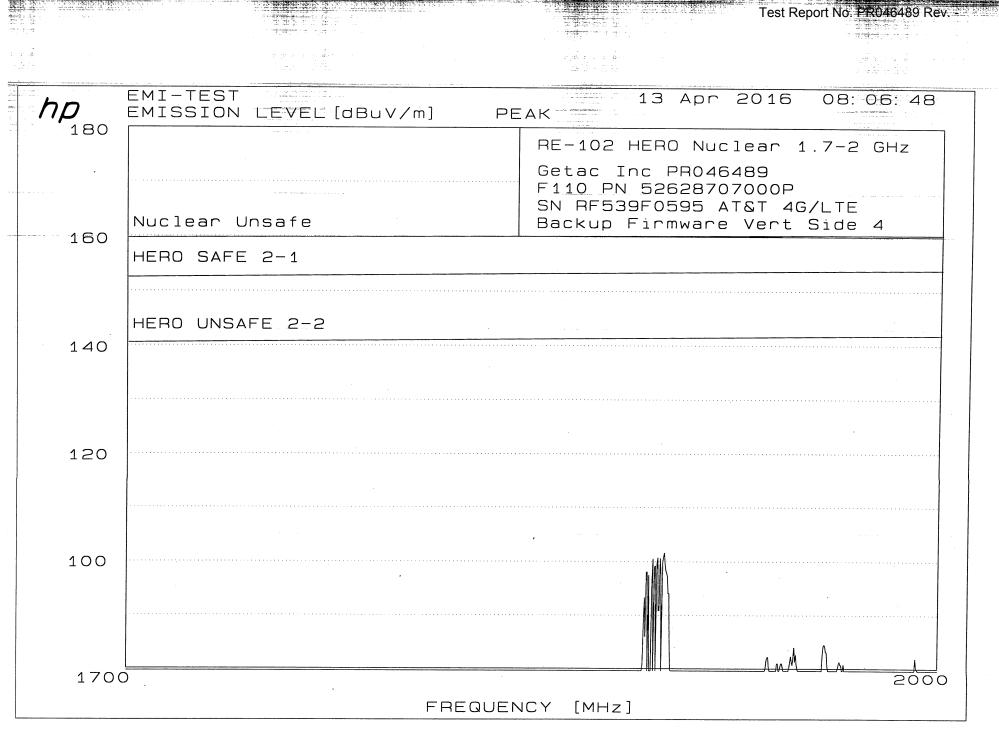
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PEAK# FREQ (MHz)	(dBuV/m)	DELTA
1 709.32	98.2	-34.7
2 707.16	97.9	-35.0
3 712.95	96.2	-36.7

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Test Report No. PR046489 ========== EMI-TEST 13 Apr 2016 08:06:48 _____ 1. MIL-STD 461E setups 1.41 RE-102 HERO Nuclear 1.7-2 GHz Peaks above -40 dB of Limit Line #1 peak criteria = 6 dB PEAK# FREQ (MHz) (dBuV/m) DELTA 1 1893.2 101.6 -39.8

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13 Apr 2016 08:06:48 1. MIL-STD 461E setups 1.41 RE-102 HERO Nuclear 1.7-2 GHz Peaks above -52 dB of Limit Line #2 peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV/m)	DELTA
1	1893.2	101.6	-51.8

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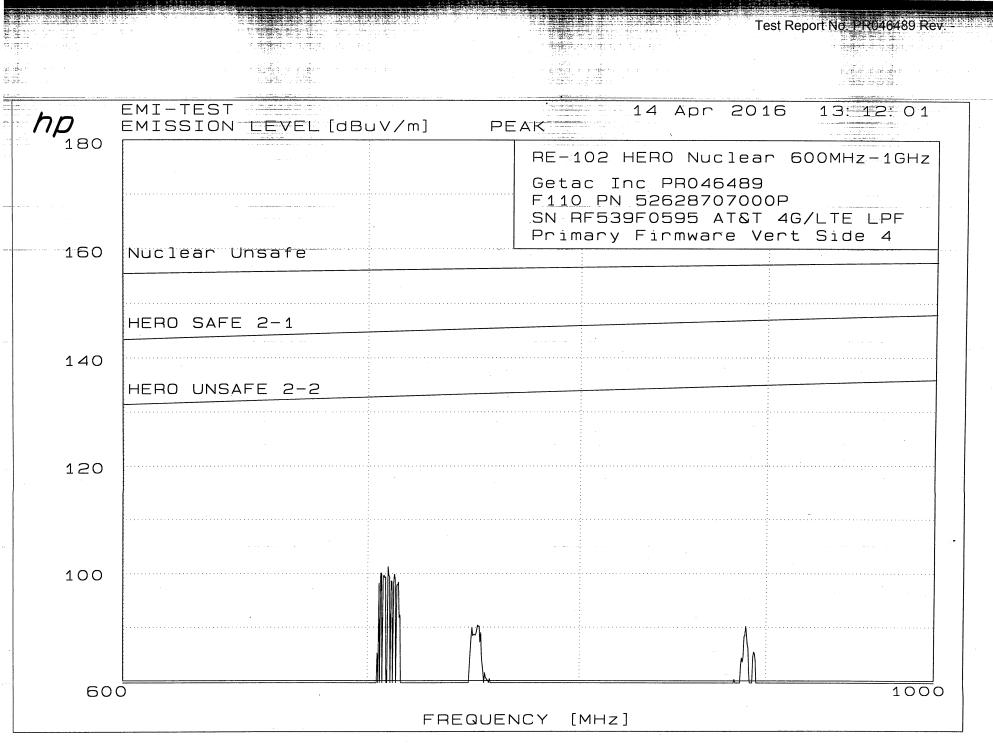
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PEAK#	FREQ (MHz)	(dBuV/m)	DELTA
1	1893.2	101.6	-58.5

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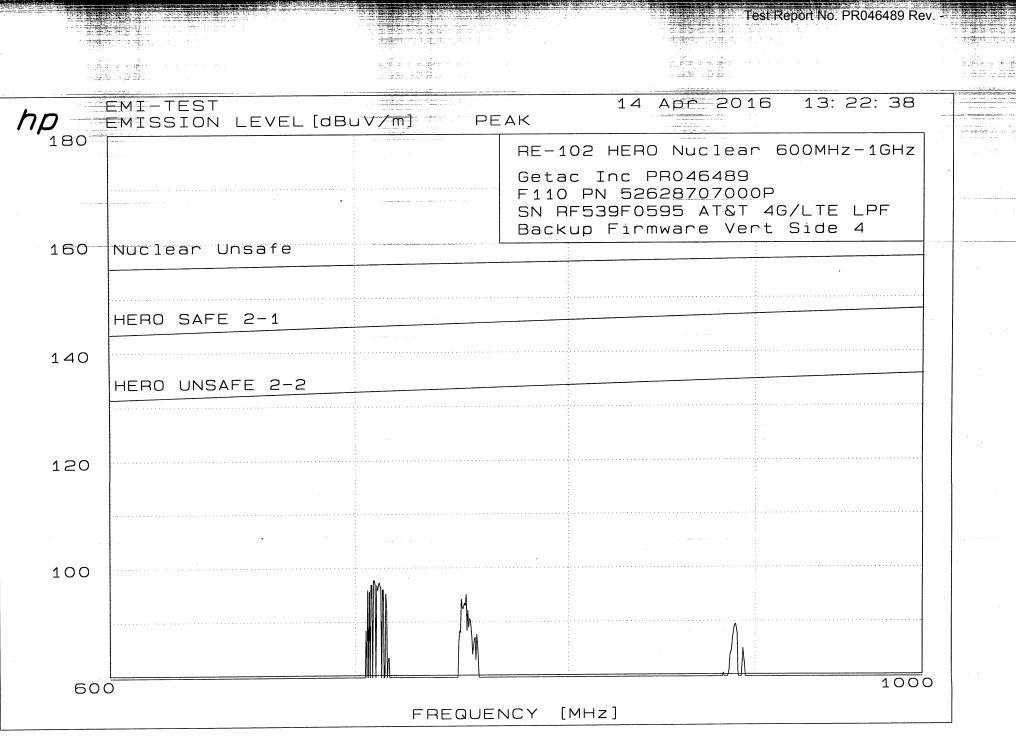
Test Report No. PR04 EMI-TEST 14 Apr 2016 13:12:01 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz Peaks above -44 dB of Limit Line #2 peak criteria = 6 dB PEAK# FREQ (MHz) (dBuV/m) DELTA

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120				
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100	· · · · · · · · · · · · · · · · · · ·			
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		FREQUEN	NCY [MHZ]	

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EM	I TES			=====	: 	====:	=====	===== Apr	====== 2016	====	Report I	Yn BRj	46489 0 4 8 9	Rev
-	_`				s Nucle	ear 1.	===== .7-2	GHz	======	====			·	
4	beak (crite	rıa =	6 dB			e #1							
	AK# L	FRE 1891	Q (MH .1	Z)) 1	dBuV/ .08.7	/m)		DELTA -32.7	,				
							41							

. . . .

EMI	TEST		:	=====	====	====	=======================================	==== Apr	====== 2016	Test Repor	46489 034	Bat g
		STD 4611 RE-102	E set 2 HEI ====	=====	clea:	r 1.7	==== 7 - 2	GHz				
Pea p PEA 1	eak cr K#	ove -45 riteria FREQ (N 1891.1	= 6 MHz)	dB	(di	Line BuV/n 8.7			DELTA -44.7			
							42					

							====						Test	Report	No. F	PR04648	Bev	
	-EMI =⊭=	-TEST		====	====	=====	====	===:			2016	5	08:0	3:10			2+0-107	
		MIL- 1.41	STD R	46 E-1	1E s 02 H	etups ERO N	ucle	ear i	1.7-2	GHz							2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Peal pe	ks ab eak c	ove	- 5	2 dB	of L						:==						
	PEAI 1		FR: 189	EQ 1.1	(MHz)	(dBu 08.	V/m)		DELI -51.							
									,		-21.	4						
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									4	3			•					

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Test Report No. PR046489 Rev. -

₩ A		INEERING		Log	
Customer: (Project Number: PR046489		
Test Item: I			Log Start Date: 4/13/2016	•	
Model P/N:	52628719	9001E	Standard: MIL-STD-461F (Ref to H	ERO)	
S/N: RG139	9R0076		Test: RE102		
Temp: 21.2	°C		Humidity: 43%		
Date	Start Time	Finish Time	NOTES	Result	Init
			All measurements were done with the receiving antenna		
			1m back from the RX10. Skype was used to drive	-	
·			the RX10 during the measurement(s).		
				-	
A /1 O /1 C	1000		802.11b Wi-Fi Testing @ 2.4GHz	Pass	
4/13/16	1300		802.11g Wi-Fi Testing @ 2.4GHz	Pass	JG
	-		802.11n @ 2.4GHz & 5GHz Wi-Fi Testing	Pass	
			802.11a Wi-Fi Testing @ 5GHz	Pass	JG
A /1 O /1 C		1	802.11ac Wi-Fi Testing @ 5GHz		
4/13/16		1500		Pass	JG
			AT&T 3G Cellular Testing		
4/19/16	1000	1100		– Pass	JG
			AT&T and Verizon 4G/LTE Cellular Testing		
4/20/16	1030	1500	Arer and verizon 40/ETE centular resting	Pass	JG
			Verizon 3G Cellular Testing.		
5/10/16	0830	0915	Verizon 50 central resting.	Pass	JG
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Tes	t Personne	el: X \~~	Customer Witness:		
			44		

Test Report No. PR046489 Rev. -



RE102/HERO Testing

PR046489

RX10 Mode and Polarity	Frequency (MHz)	Measured RE102 dBuV/m	Converted HERO V/m	dB Below HERO Spec	Calculated Safe Distance	Effective Safe Distance
Verizon (Full Power) 3G Vert Edge 3	842.43	99	0.09	-35.4	0.67″	0"
Verizon (Full Power) 4G/LTE Vert Edge 3	783.54	103.2	0.14	-30.6	1.16"	0"
Verizon (Full Power) 4G/LTE Vert Edge 3	1723.9	106.8	0.22	-33.8	0.80"	0"
AT&T (Full Power) 3G Vert Edge 3	1908.6	123.2	1.45	-18.3	4.79"	0"
AT&T (Full Power) 4G/LTE Vert Edge 3	709.69	121.4	1.17	-11.5	10.48"	0"
AT&T (Full Power) 4G/LTE Vert Edge 3	1908.3	119.5	0.94	-22.0	3.13"	0"
802.11b 2.4GHz Vert Face (4)	2464.4	113.7	0.48	-30.0	1.24"	0"
802.11g 2.4GHz Vert Face (4)	2459.1	110.2	0.32	-33.5	0.83"	0"
802.11n 2.4GHz Vert Face (4)	2463.8	110	0.32	-33.7	0.81"	0"
802.11a 5GHz Vert Face (4)	5748.6	106.9	0.22	-44.1	0.25 "	0"
802.11n 5GHz Vert Face (4)	5747.6	107.1	0.23	-43.9	0.25"	0"
802.11ac 5GHz Vert Face (4)	5747.6	106.4	0.21	-44.6	0.23"	0"

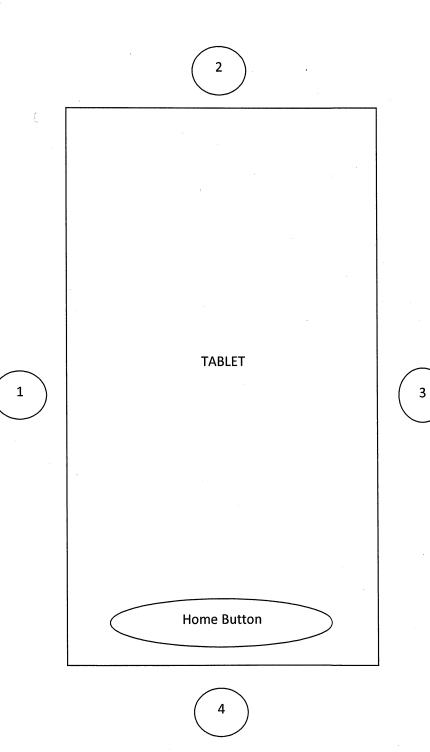
Note: The Practical (Effective) Safe Distance between the RX10 and any ordinance is 0" because the antenna elements for the RX10 are internal.

	RX10 Tablet	
Mode (Frequency)	Verizon (frequency/band)	Complete
Verizon 3G	850MHz (band 0)	x
Verizon 4G/LTE	700MHz (band 13, block C)	x
AT&T 3G	850MHz (band 5)	x
AT&T 4G/LTE	700MHz (band 17, block B/C)	v
	1900MHz (band 2)	X
Mode	frequency/channel	Complete
802.11b	2.4GHz	X
802.11g	2.4GHz	x
802.11n	2.4GHz	x
802.11a	5GHz	x
802.11n	5GHz	x
802.11ac	5GHz	х

HERO/RE102 Testing

Getac Inc

Apple IPAD Position of Highest Radiation										
Tablet	WiFi	Cellular								
RX10	Vertical – Face (Edge 4 down)	Vertical – Edge 3								



			Test Report No: PR046489 Rev	
hp	EMI-TEST EMISSION LEVEL [dBu	IV/m] PEAK	13 Apr 2016 14:04:46	
180			HERO Nuclear 2.3-2.5GHz	
	Nuclear Unsafe	RX10 P SN RG13	Inc PR046489 N 52628719001E 39R0076 b (2.4GHz) Face Side 4	
160	HERO SAFE 2-1			
	HERO UNSAFE 2-2			
140		· · · · · · · · · · · · · · · · · · ·		
	· · · · · · · · · · · · · · · · · · ·			
120	· · · · · · · · · · · · · · · · · · ·			
100				
,				
230	0		2500	
		FREQUENCY [MH2	z]	

	EMI TES'	===== F	=======================================	======================================	Test Report No. PR046489 Rev. ====================================
■ 現代を行いため、「「」」、「」、「」、「」、「」、「」、「」、「」、「」、「」、「」、「」、「	1.3		etups ERO Nuclear 2.3-2 ====================================		========
	Peaks al peak d PEAK# 1 2 3 4	FREQ (MHz 2464.4 2460.5 2463.8 2462.4		DELTA -30.0 -30.1 -30.4 -30.8	PROA6489

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===	- TES	===		==		:====	====		====	13 <i>A</i>	===:	2016	======= 14:04:	==== 46). PR04648 ======	9 Rev :====
1.	MII 1.3]-S' }9 ===	TD RE	461 -1(.E s)2 H	etu IERO	ps Nuc	clea	r 2.	3-2.5	5GH2	z z				
Pea p	ks a eak	abo [.] cr	ve ite:	-43 ria	d dE	of	Lir	nit :								
PEA 1 2 3 4		2 2 2	FRE 464 460 463 462	.4 .5 .8	MHz	;)		11: 11: 11:	BuV/ 3.7 3.6 3.3 2.9	m)		DELTA -42.0 -42.1 -42.4 -42.8		JP (R () / 5	水谷物
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EMI - TEST		=======================================	 Apr 2016	Test Report No. PR04	6489 Rev ======
1.39 ======= Peaks abo	======================================	======================================	=========	=====	
peak cr PEAK# 1 2 2 2	iteria = 6 (FREQ (MHz) 464.4 460.5 463.8	dB (dBuV/m) 113.7 113.6 113.3	DELTA -47.5 -47.6 -47.9	PRO 46	489
					•

				Test Report No: PR046489 Rev
ћр 180	EMI-TEST EMISSION LEVEL [dBu	V/m] PE	13 AK	3 Apr 2016 14:09:57
100			RE-102 HEF	RO Nuclear 2.3-2.5GHz
			SN RG139R	2628719001E 0076
160	Nuclear Unsafe	1997 - M. M. Markara, and a state of the sta	802.11g (2	2.4GHz) Face Side 4
	HERO SAFE 2-1			
	HERO UNSAFE 2-2	· · · · ·		
140	· · · · · · · · · · · · · · · · · · ·	······································		
	· · · · ·			
120				
120				
100				
2300	0			2500
		FREQUEN	NCY [MHz]	

34**40000**17 7 4 - 2004

								Test R	eport No. PR04	6489 Rev
===	-TEST ===== MIL-	-====: -STD 4	====== 461E s	etups	=====	====:		======= 6		======
===	1.39) RE-	-102 Hi ======	ΞRΟ Νι ======	uclear ======= imit Li		.5GHz =======	=======	====	
p PEA 1	eak c	rite	ria = 0 Q (MHz)	5 dB	(dBu 110.	V/m)	DEL' -33			L h 89
								• 5	PR04	040 /
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		· · · ·						•	· · · · · · · · · · · · · · · · · · ·	

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				=====	===:	= == == = = =	====:	= = = = :	=====:	Test Re	port No.	PR0464	89 Rev
===	-TEST ===== MIL- 1.39	===== STD 4 RE-	===== 161E s -102 H	===== etups ERO N	ucle	===== ear 2		====:	2016 =====:	14:09 =====			
=== Pea PEA 1	===== ks abo eak c: K#	===== ove - riter	====== -46 dB fia =) (MHz	===== of L 6 dB	==== imit		===== e #2		DELTA -45.5		PR	046	489
									•				

EMI-TEST 13 Apr 2016 14:09:57 1. MIL-STD 461E setups 1.39 RE-102 HBRO Nuclear 2.3-2.5GHz Peaks above -52 dB of Limit Line #3 peak criteria = 6 dB PEAK# FFEO (MHz) (dBuV/m) DELTA 1 2456.5 109.3 -51.9 PR046489 		A second		1			-)		Test I	Report	: No. PR046	
1.39 RE-102 HERO Nuclear 2.3-2.50Hz Peaks above -52 dB of Limit Line #3 peak criteria = 6 dB PEAK# FREO (MHz) (dBuV/m) DELTA 1 2459.1 109.3 -51.9 PR046409 109.3 -51.9 PR046409		===	=====	======	=====	=====		=====	13 ===	_				7	
peak criteria = 6 dB PEAK# FREO (MHz) (dBuV/m) DELTA 1 2466.5 109.3 -51.9 PR046489 PR046489		===	1.39	RE-1=====	.02 HE	RO Nu =====	====	===		.5GH:	Z =====:		====		
¹ 2 ^{2459.1} ² 2466.5 ^{109.3} -51.9 PR0464 ⁸⁹		p	eak c	ove -5 riteri	2 dB .a = 6	of Li dB	mit	Line	#3						
		1		2459.1			11	0.2	l)		-51.0		P	R04(548 9
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	構築 (F)							,							
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			Test Report No: PR046489 Rev
9. – –			
hp	EMI-TEST EMISSION LEVEL [dBuV/m]	13 Ар РЕАК	r 2016 14:45:41
180			uclear 2.3-2.5GHz
	Nuclear Unsafe	Getac Inc PR0 RX10 PN 52628 SN RG139R0076 802.11n (2.4G	719001E
160	HERO SAFE 2-1		
	HERO UNSAFE 2-2	· · · · · · · · · · · · · · · · · · ·	·
140			
		······	
120	· · · · · · · · · · · · · · · · · · ·		
100	· · · · · · · · · · · · · · · · · · ·		
2300		REQUENCY [MHz]	2500

1.1

EMI	- TES	SТ	:	==:	===		===:	====	===== 13 N	====================================	======	====	t No. PR046	6489 Rev =====
===	=== MI]	==== L-S1	D 4	=== 611 102	==== E se 2 HE	==== tups RO N	==== ucle	===== ear 2	13 A ====== .3-2.5	pr 2016 ====== GHz	5 14:4	⊃:4. ====	L =	
Pea	==== ks a	==== abov	===:	==: 34	==== dB	==== of L	===:	===== : Lin	======	======		====	=	
PEA 1	K#	F 24	REQ	ן) 8	MHz)		-	(dBuV 110	/m)	DEL] -33.		e	PR04	6489
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			======================================	=======================================		45:41
	ees Pea	========= aks above	==========	======================================		====
	《读句句:	AK# FR] 2463	EQ (MHz) 3.8	(dBuV/m) 110	DELTA -45.7	BR046489
						· ·
1.1						
1 1910						
				58		

===	-TEST ======= MIL-STD	======== =============================	======================================	Apr 2016	14:45:41	PR046489 Rev.
=== Pea	1.39 R ====================================	E-102 HERC -52 dB of eria = 6 d EQ (MHz) 3.8	Nuclear 2.3-2. ====================================	5GHz DELTA -51.2 -51.6	 P R (146489
			59			

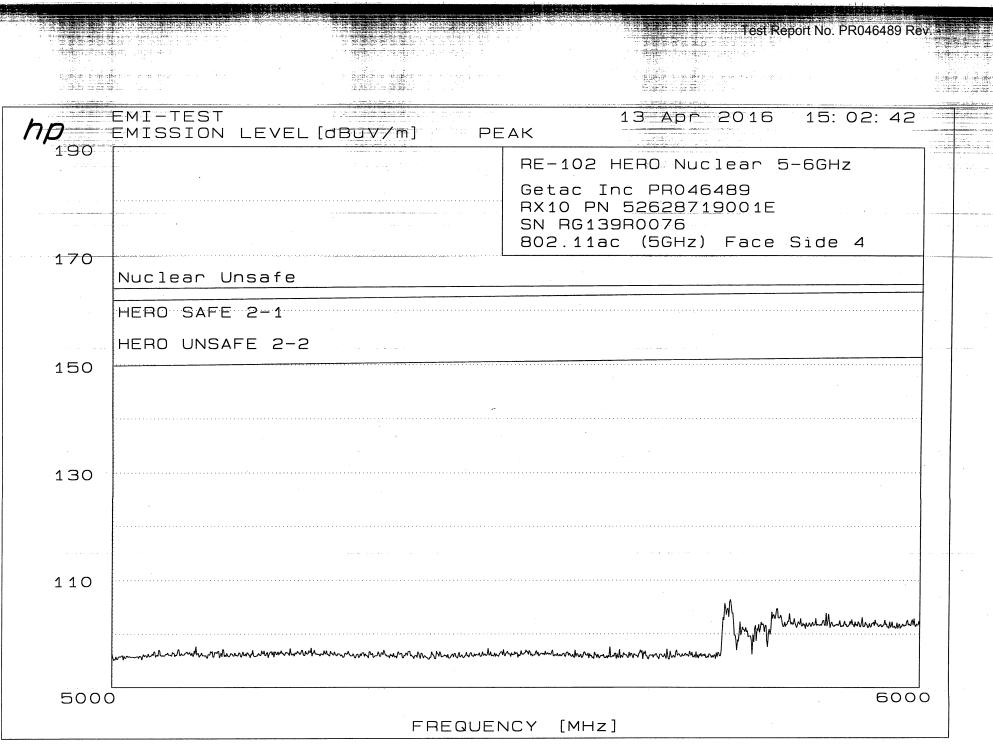
		Test Report	No PR046489 Rev
hp	EMI-TEST EMISSION LEVEL [dBuV/m] PE	13 Apr 2016 1 АК	4: 49: 41
190		RE-102 HERO Nuclear 5-6	GHz for the second s
		Getac Inc PR046489 RX10 PN 52628719001E SN RG139R0076 802.11a (5GHz) Face Side	e 4
170	Nuclear Unsafe		
	HERO SAFE 2-1		
	HERO UNSAFE 2-2		
150			
130			
) 		•
110		M	montheman
	wannow want water and the warder w		
500			6000
	FREQUE	NCY [MHz]	

CONTRACTOR OF

				T =========	est Report No. PR046489 R	lev
	===	-TEST MIL-STD 461E setu 1.38 RE-102 HERO		r 2016 14	4:49:41 =======	
	=== Pea	s above -45 dB of	======================================	========		
	PEA: 1 2	K# FREQ (MHz) 5748.6 5743.4	(dBuV/m) 106.9 106.6	DELTA -44.1 -44.4	PR046409	
ana			• •			
			61			

			а. •	=====							Tes	t Rep	ort No.	PR04	6489 Rev	
	===	- TEST	=====			====	====:		-	2016 =====		49:4 ====		:====	=====	
	1 .	MIL- 1.38	STD 4 RE-	61E se 102 HI	etups ERO Nu	clea	ir 5-0	6GHz								
	1.4 8 (44			====== 57 dB ia = 6	=====	====	===:	====	====	====:	====	===:	= ==			
	PEA.) (MHz)			lBuV/1			DELTA	٨					
	1 2		5748. 5743.	6		10	6.9 6.6	,		-56.4	1		PR	n 4	648	9
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		=======================================	Test Report No. PR046489 Rev
	-TEST MIL-STD 461E set 1.38 RE-102 HER	13 Apr 2 	
Pea p	ks above -58 dB c eak criteria = 6	======================================	===========
PEA: 1			$\mathbb{P}\mathbb{R}\mathbb{O}46489$
		63	



EM]					====== 13 Apr	===========	st Report No. PR0464 ===================================	+09 KG
	MIL-9 1.38	STD 461E RE-102 1	setups HERO Nuc	===================================	GHz			
Pea	iks abo beak c	======================================	======= 3 of Lim 6 dB	======= it Line	====== #1			
PEA 1	∆K# . !	FREQ (MH: 5747.6	z)	(dBuV/m 106.4	1)	DELTA -44.6	PRO46	489
					65			1.

EMILES			======================================	======================================	R046489 Rev ======
======= Peaks <i>a</i>	===============	tups RO Nuclear 5-6GHz ====================================	==============================		;
PEAK#	FREQ (MHz) 5747.6		DELTA -56.6	PR	046489
			· · · · · · · · · · · · · · · · · · ·		
		66			

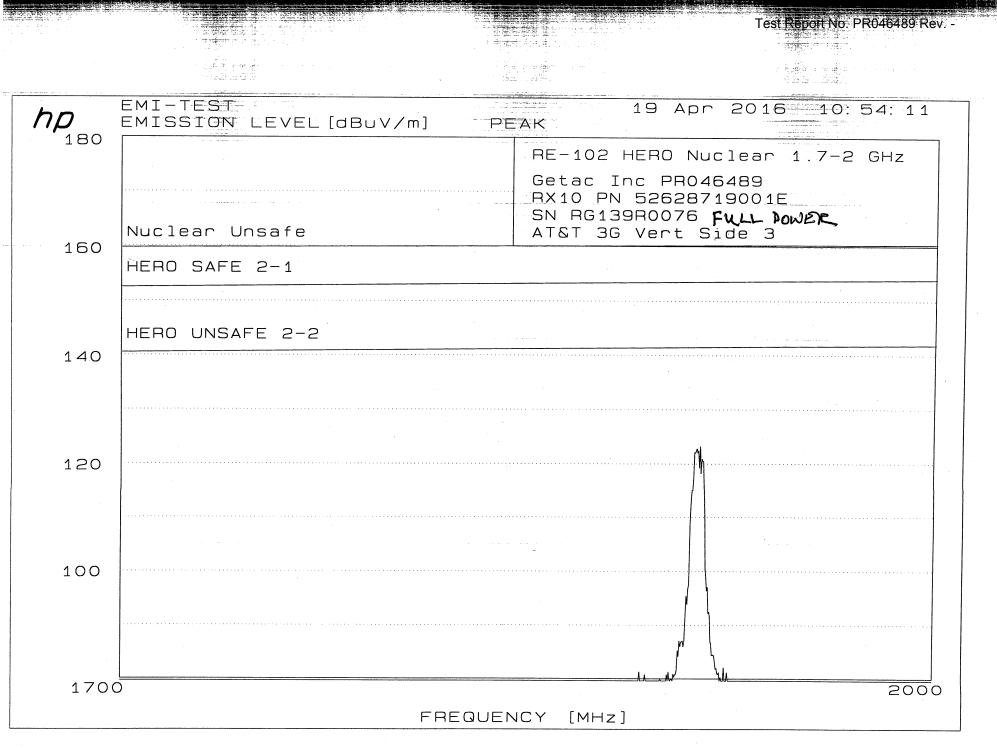
	I TEST = MIL-	====== STD 461E set	======================================	======================================	======================================	No. PR046489 Rev =======
=== Pea	1.38 ===== aks ab	RE-102 HER ====================================	O Nuclear 5 =============== of Limit Lin	==================		
	¥K# L	FREQ (MHz) 5747.6	(dBuV 106.4	/m) DELT -58.	A 2	PR046489
				67		

			Test Report No. PR046	489 Rev
	n an an Angelan Angelan an Angelan Angelan an Angelan an An Angelan an Angelan an An			
Πp	EMI-TEST Emission level	[dBuV/m] PE	<u>13 Арг</u> 2016 14:54: Ак	50
190			RE-102 HERO Nuclear 5-6GHz	
			Getac Inc PR046489 RX10 PN <u>526287</u> 19001E SN RG139R0076 802.11n (5GHz) Face Side 4	
170	Nuclear Unsafe			
	HERO SAFE 2-1			
14 - 14 a 44	HERO UNSAFE 2-2			
150				
130				
4.4.0		· · • • • • • • • • • • • • • • • • • •		· · · · · · · · · · · · · · · · · · ·
110			M pontone and a second and as second and a second and as second and a second and an	www.
	Nowwww.	Munnum Munnul	man har and har	
5000	L)		E	5000
		FREQUEN	ICY [MHz]	

	and the second se Second second s				====		====	====:	====:	= == == ==	=====	Test Report	No. PR04	6489 Rev	
EM]		EST ==== EL-S	==== 5TD	=== 461	==== E se	tups RO Ni	=====	====:			2016	14:54:50 =======			
=== Pea	aks	abo	ove	-44		of Li			:	====	=====				
	\K#			Q (1	MHz)		(d 10	BuV/1 7.1	n)		DELTA -43.9		PRO	14648	9
															-
		(1, 1, 2, 2, 3) = (1, 2, 3)							69						

EMI	TEST		==========		====== 13 Apr	======================================	Test Report No ====================================). PR046489 Rev =======
	MIL-ST 1.38	======================================	etups SRO Nucle	======================================	====== 5GHz			
Pea p	ks above eak cri	e -56 dB teria = 0	of Limit 5 dB	: Line	#2			PR046489
PEA 1	K# F] 574	REQ (MHz) 47.6	; , ;	(dBuV/n 107.1	n) ,	DELTA -55.9		
				•				
					70			

	======================================		======================================	======= :54:50	lo. PR046489	=====
====	MIL STD 461E setups 1.38 RE-102 HERO N					
pe	s above -58 dB of I ak criteria = 6 dB	jimit Line #3			PRO	46489
PEAK 1	# FREQ (MHz) 5747.6	(dBuV/m) 107.1	DELTA -57.5			
						•
						•

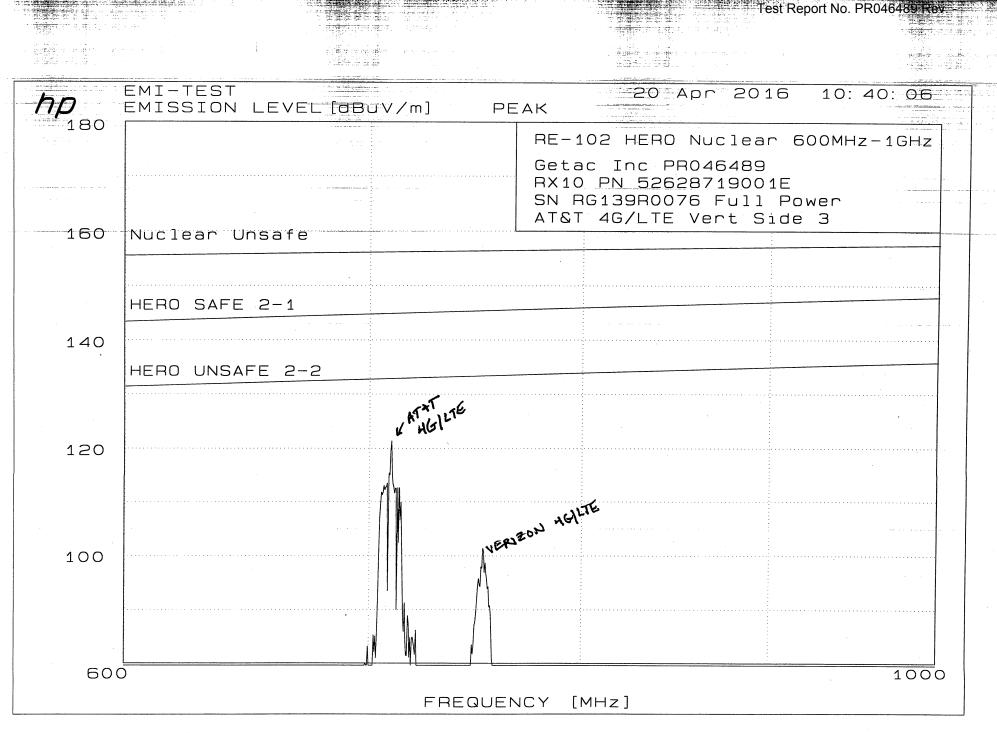


		=	=====	· · · ·	====	====		====	======	Test I	Report No). PR0464	89 Rev =====		
==:	. MIL-S	TD 46	===== 1E se 02 HE	===== tups RO Nuo			====	====	2016	10:5 ====	4:11 ====	PRI	Ö462	18g)
] PE	====== aks abo oeak cr AX#	===== ve -2 iteri	===== 0 dB a = 6 (MHz)	of Lir dB	==== nit (d		==== #1 m)	· 	DELTA -18.3						
									•						
							73								

EMI	-TEST	=======			=======================================	Test Report No ====================================	o. PR046489 Rev ========
.1.		======================================	nps Nuclear 1.7				PR046489
Pea PEA 1	eak crite	eria = 6 d EQ (MHz)	Limit Line B (dBuV/n 123.2		DELTA -30.3		
							· ·
				74			

-

	=====). PR046489 Rev
===	-TEST 	19 Apr 2016 10:54:11	PR046489
=== Pea PEA 1	<pre>cs above -40 dB c ak criteria = 6</pre>	RO Nuclear 1.7-2 GHz 	
		75	



Test Report No. PR046489 Rev. -

PR046489

EMI-TEST

20 Apr 2016 10:40:06 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz Peaks above -12 dB of Limit Line #1

peak criteria = 6 dB

====

PEAK#	FREQ (MHz)	(dBuV/m)	DELTA
1	709.69	121.4	-11.5

		===================		Test Report No	. PR046489 Rev
EMI TESI ====================================	==================	======================================	20 Apr 201	6 10:40:06	PR046489
Peaks ab	ove -35 dB o:	======================================		======	•
PEAK#	riteria = 6 (FREQ (MHz) 709.69	(dBuV/m			
	709.69	121.4	-34	.7	
		• •	78		

EMI	E F		-	===:		====	====	=====	===== Apr	 2016	=====	Report =====	No. PRC	46489 Re	v = ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
===	MIL-9 1.40	-RE ====	102===	HEI	RO N1 =====	====	ar 6	===== 00MH:	===== z-1GH	=====	=====	=====		- U 4	⁶⁴⁸ 2
Pea p PEA 1		riter FREQ 709.	ia) (M	= 6	of L. dB	(Lin dBuV 21.4	/m)		DELTA -23.5					
								•							
· 电磁电子 电子 电子 一下,一下,一下,一下,一下,一下,一下,一下,一下,一下,一下,一下,一下,一															
								79							

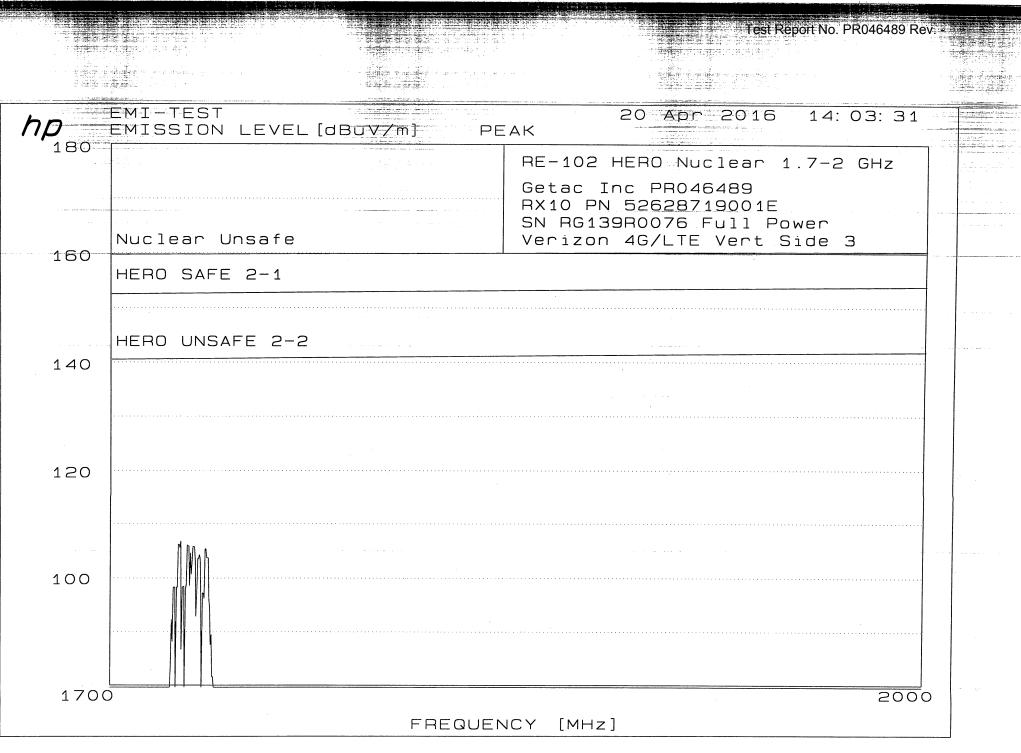
		Test Report No. PR046455 Rev
ПР Е	MI-TEST MISSION LEVEL [OBUV/m] РЕАК <u>20 Арг 2016</u> 13: 17: 35
180		RE-102 HERO Nuclear 600MHz-1GHz
		Getac Inc PR046489 RX10 PN 52628719001E SN RG139R0076 Full Power
160	Nuclear Unsafe	Verizon 4G/LTE Vert Side 3
	HERO SAFE 2-1	
140	ILHU SAIL 2-1	
	HERO UNSAFE 2-2	
•		
120		
100	······	

FREQUENCY [MHz]

- <u>An th</u>	E E	1.000 - 1.1	=====	=========		======== pr 2016	Test Report No ====================================		
===	====:	====	====:	tups RO Nuclear ====================================	600MHz-	======================================		- RO	46489
р РЕА 1 2	еак с: К#	FREQ 783.5 781.9	a = 6 (MHz) 4	dB	uV/m) .2	DELTA -30.6 -30.8			
					81				

EMI - TEST 				13:17:35	046489 Rev
Peaks abo peak c: PEAK# 1 2	ove -43 dB d riteria = 6 FREQ (MHz) 783.54	dB (dBuV/m 103.2	#2		
2	781.94	102.9	-42.8		
			82		

EMI	TEST			=======================================	====== 20 Apr	====== 2016	Test Report No ====================================	. PR046489 R ======4	ev [≢] ₹ 6 4 8 9
Pea	1.40 ===== ks abo	RE-1 ====== ove -5	====== 54 dB (tups RO Nuclear 60 ====================================	0MHz-1G	====== Hz =======			° 8°
р РЕА 1 2 3	K#		94	dB (dBuV/1 103.2 102.9 102.8	m)	DELTA -53.3 -53.6 -53.7			
					•				



Test Report No. PR046489 Rev			
	=======================================	Test Report No.	PR046489 Rev
	=======================================	or 2016 14:03:31	PR RO46489
1. MIL-STD 461E setup 1.41 RE-102 HERO	s Nuclear 1.7-2 GH	Iz	* 3 9
Peaks above -34 dB of peak criteria = 6 dB	======================================	===============================	
PEAK# FREQ (MHz) 1 1723.9	(dBuV/m) 106.8	DELTA -33.8	
	85		

				====	====						Test Repo	rt No. PF	046489 Re	€V
===	-TEST 	==== STD	===== 461E	==== set	==== ups	===:	====		===	2016 ======	Test Repo ======= 14:03:3 =======	====== 1 =	- N OZ	:= ⁶ \$\$@@
=== Pea	1.41 ===== .ks ab	RE ==== ove	E-102 ===== -46 (HER ==== dB c	20 Nu ===== of Li	====		.7-2 ===== e #2	GHz		=======	=		^o y
р РЕА 1	eak c K#	rite	eria : EQ (MI	= 6	dB	(0	dBuV 06.8	/m)		DELTA -45.8				
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1								86						

				Test Report No. I	PR046439 Rev
=== EMI-TEST ================			======================================	14:03:31	PR046499 Rev ====================================
1. MIL-STD 4611 1.41 RE-102	E setups 2 HERO Nuclear	1.7-2	GHz		C ^{S^r}
Peaks above -53 peak criteria	dB of Limit L: = 6 dB	====== ine #3	===========		
PEAK# FREQ (N 1 1723.9	(dBu 106	uV/m) .8	DELTA -52.9		
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		87			
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			Test report No. PR046489 Rev					
<i>hp</i> ₁₈₀	EMI-TEST EMISSION LEVEL [dBuV/m]	20 A PEAK	pr 201 <u>6 1</u> 4:35:36					
180		Getac Inc PR	Nuclear 1.7-2 GHz 046489 87190015					
160	Nuclear Unsafe AT&T 4G/LTE Vert Side 3							
	HERO SAFE 2-1							
140	HERO UNSAFE 2-2	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·					
		······						
120			\bigwedge					
100		· · · · · · · · · · · · · · · · · · ·						
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1700	 D		2000					
	FR	EQUENCY [MHz]						

	- - ==		=========			Test Report No	D. PR040488	ev Pā 6489
EMI-TEST ===================================		======================================	=========	20 Apr	2016	14:35:36		46480
	=======	E setups 2 HERO Nuc ====================================			=======	========		*
		dB of Lin = 6 dB						
PEAK#	FREQ (1 1908.3	MHZ)	(dBuV/m 119.5	1)	DELTA -22.0			
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	1.	. M 1	IL-8 .41	STD R	46 E-1	1E 02	se HE	tups RO N	ucle	ear	c 1.	. 7 - 2	2 GH	Z								"&g
	Pea	aks Dea	abo k ci	-== ove rit	=== -3 eri	=== 5 (=== dB = 6	==== of L dB	imit	=== : I	ine	==== = #2	==== 2	===:	====	====	===	=				
	PEA 1		A second s	FR	EQ 8.3	(MI			:	dE	3uV/ 9.5				ELTA 34.0							
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	1.41	. RI ====	E-10 ====	2 HE ====	RO Nuc ======	=====	====	GHz							ý
Pea F PEA 1	∆K#	1.516	EQ (I	dB = 6 MHz)	of Lim dB	nit Lin (dBu 119.!	V/m)		DELTA -40.6						
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							91	I							
											1			l,	

np	EMI-TEST Emission level [dbuv/m] f	10 May 2016 09:02:06 PEAK					
180		RE-102 HERO Nuclear 600MHz-1GHz					
		Getac Inc PR046489 RX10 PN 52628719001E SN RG139R0076 Full Power Verizon 3G Vert Side 3					
160	Nuclear Unsafe						
· ·	HERO SAFE 2-1						
140							
	HERO UNSAFE 2-2						
120							
100							
600		1000					
FREQUENCY [MHz]							

Test Report No. PR049489 Rev

EMI-TEST 10 May 2016 09:02:06 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz Peaks above -40 dB of Limit Line #1 peak criteria = 6 dB PEAK# FREQ (MHz) (dBuV/m) DELTA

99

-35.4

1

842.43

Test Report No. PR046 EMI-TEST 10 May 2016 09:02:06 ______ 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz ______ Peaks above -50 dB of Limit Line #2 peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV/m)	DELTA
1	842.43	99	-47.4

Test Report No. PR046489 Rev. EMI-TEST 10 May 2016 09:02:06 1. MIL-STD 461E setups 1.40 RE-102 HERO Nuclear 600MHz-1GHz Peaks above -60 dB of Limit Line #3 peak criteria = 6 dB

PEAKĦ	FREQ (MHZ)	(dBuV/m)	DELTA
1	842.43	99	-57.8





EQUIPMENT LIST

NTS ID	Description	Last Cal	Cal Due
EMI HERO (RE102	2) <u>11-Apr-16</u>		
JV043 (Old ID #) JV043	HP Spec. analyzer, Option 462 Impulse Bandwidth Model No: 85662A Serial No: 3026A19911	20-Nov-15	30-Nov-16
JVO44 (Old ID #) JVO44	HP Spectrum analyzer Model No: 8566B Serial No: 3014A07158	20-Nov-15	30-Nov-16
JV045 (Old ID #) JV045	HP RF Preselector 20Hz - 2GHz Model No: 85685A Serial No: 2724A00672	20-Nov-15	30-Nov-16
TE0661 (Old ID #) TE0661	Emco Double Ridged Horn 1-18GHz Model No: 3115 Serial No: 2751	14-Jul-14	31-Jul-16
TE0783 (Old ID #) TE0783	EMCO Double Ridged Horn 200 - 2000 MHz Model No: 3106 Serial No: 2079	15-Jul-14	31-Jul-16
TE1207 (Old ID #) TE1207	Panashield EMI Chamber 20(W) x28x (D) x12(H) Model No: Custom Serial No:	MO	NCR

MO: Maintenance Only NCR: No Calibration Required VAT: Verified at Test NPCR: No Periodic Calibration Required FIO: For Indication Only



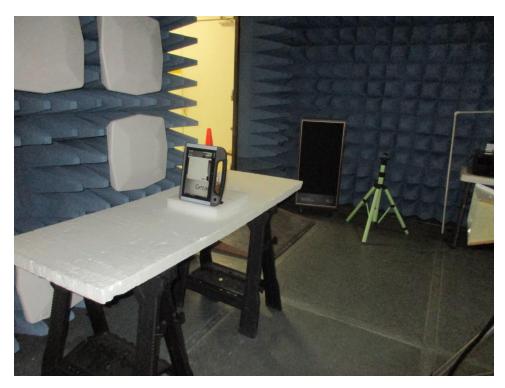


11 April 2016 -- HERO Wi-Fi Vertical Edge 4 Getac Inc. Tablet, P/N F110, S/N RF539F0595 & RF539F0597



13 April 2016 -- HERO Wi-Fi Vertical-Face Edge 4 Down Getac Inc. Tablet, P/N RX10, S/N RG139R0076





19 April 2016 -- HERO Cellular Vertical Edge 3 Getac Inc. Tablet, P/N RX10, S/N RG139R0076



Test Report No. PR046489 Rev. -

End of Report