TEST REPORT

FCC ID: 2AJAN-SMH100 Product:Hero 100 DAS Model No.: SMH100 Additional Model No.: SMHW100 Trade Mark: Signifi Mobile Report No.: TCT201116E005 Issued Date: November 21, 2020

Issued for:

Signifi Mobile Inc 1001 Rue Lenoir Suite A-414, Montreal, Quebec, H4C2Z6 , Canada

Issued By:

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CT通测检测 TESTING-CENTRE TECHNOLOGY Report No.: TCT201116E006 **Test Certification** 1. **Product:** Hero 100 DAS Model No.: **SMH100** Additional **SMHW100** Model: **Trade Mark:** Signifi Mobile **Applicant:** Signifi Mobile Inc Address: 1001 Rue Lenoir Suite A-414, Montreal, Quebec, H4C2Z6, Canada **Manufacturer:** Address:

Date of Test:November 9, 2020 ~ November 21, 2020Applicable
Standards:FCC CFR 47 PART 2/Part90.219;
ANSI C63.26-2015;
KDB 935210 D05 Indus Booster Basic Meas v01r04.

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Reviewed By:

Beryl Zhao

msr

Rleo

Approved By:

Tomsin

November 21, 2020

Date:

Date: November 21, 2020



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2. Test Result Summary

TCT 通测检测 TESTING CENTRE TECHNOLOGY

Applied Standard: FCC CFR 47 PART 2/Part90.219								
FCC Rules	Description of Test	Result						
§90.219	Out-of-band Rejection	Compliant						
\$90.219 (e)(1) KDB 935210 D05 v01r04	Input/output power and amplifier gain	Compliant						
\$90.219 (e)(4)(ii) KDB 935210 D05 v01r04	Input-versus-output signal comparison: Occupied Bandwidth	Compliant						
\$90.219 (d)(6) KDB 935210 D05 v01r04	Intermodulation	Compliant						
\$90.219 (e)(3) KDB 935210 D05 v01r04	Spurious emissions at antenna terminals	Compliant						
\$90.219 (e)(3) KDB 935210 D05 v01r04	Radiated spurious emission	Compliant						
§90.219 (e)(2) KDB 935210 D05 v01r04	Noise Figure Measurements	Compliant						
\$2.1055 KDB 935210 D05 v01r04	Frequency tolerance	Not Applicable*						
§2.1091	Maximum Permissible exposure (MPE)	See MPE Report						

Note:

- 1. Compliant: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.
- 5. the booster does not alter the input signal in any way.

3. EUT Description

Product Name:	Hero 100 DAS	
Model :	SMH100	
Additional Model:	SMHW100	
Trade Mark:	Signifi Mobile	
Operation Frequency:	Band 12 Uplink: 698 MHz - 716MHz, Downlink: 728 MHz - 746MHz Band 14 Uplink: 788 MHz - 798MHz, Downlink: 758 MHz - 768MHz	
Emission Designator:	G7D,W7D	
FCC Classification:	Industrial Signal Booster(B9B)	
Power Supply:	DC 12V 3.0A,36W	
AC adapter:	Adapter Information: MODEL: GM53-120300-F INPUT: AC 100-240V,50/60Hz, 2.0A OUTPUT: DC 12V 3.0A,36W	
Remark:	PCB board, same design and work diagrams of these model(s) are the same, So no additional models were tested.	

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

	Antenna Gain(dBi)					
Frequency (MH ₇)	Vagi antenna	Outdoor Panel	Cable loss			
(IVIIIZ)	i agi antonna	Antenna	(dB)			
698-716	9.5	7.0	0.8			
788-798	9.5	7.0	0.8			
Frequency	Indoor Omni	Indoor Panel	Cable loss			
(MHz)	Antenna	Antenna	(dB)			
728-746	3.0	7.0	1.7			
758 -768	3.0	7.0	1.7			
	Frequency (MHz) 698-716 788-798 Frequency (MHz) 728-746 758 -768	Frequency (MHz) Yagi antenna 698-716 9.5 788-798 9.5 Frequency (MHz) Indoor Omni Antenna 728-746 3.0 758 -768 3.0	Antenna GaiFrequency (MHz)Yagi antennaOutdoor Panel Antenna698-7169.57.0788-7989.57.0Frequency (MHz)Indoor Omni AntennaIndoor Panel Antenna728-7463.07.0758 -7683.07.0			



General Information



4.1. Test environment

4.

Operating Environment:						
Temperature:	25.3 °C					
Humidity:	52.3 % RH					
Atmospheric Pressure:	1010 mbar					

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

			Serial Ino.	FCC ID	Trade Name	
/	9)	/		1	/	
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5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

• IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1 °C
7	Humidity	±1.0%

6. Test Results and Measurement Data

6.1. OUT-OF-BAND REJECTION

Applicable Standard

Signal booster passbands are limited to the service band or bands for which the operator is authorized. In general, signal boosters should utilize the minimum passband that is sufficient to accomplish the purpose. Except for distributed antenna systems (DAS) installed in buildings, the passband of a Class B booster should not encompass both commercial services (such as ESMR and Cellular Radiotelephone) and part90 Land Mobile and Public Safety Services.

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Test Procedure

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
- 1) Frequency range = ± 250 % of the manufacturer's specified pass band.
- 2) The CW amplitude shall be 3 dB below the AGC threshold (see 4.2), and shall not activate the
- AGC threshold throughout the test.
- 3) Dwell time = approximately 10 ms.
- 4) Frequency step = 50 kHz.
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the RBW of the spectrum analyzer to between 1 % and 5 % of the manufacturer's rated
- passband, and VBW = $3 \times RBW$.
- e) Set the detector to Peak and the trace to Max-Hold.

f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the level has fallen by 20 dB).

g) Capture the frequency response plot for inclusion in the test report.

Test Data



Knysight Spectrum Analyzer - Swept SA Knys Spectrum Analyzer - Swept SA Knysight Spectrum Analyzer -	ALIGN AUTO 03:37:37 PM Nov 20, 2020 #c Log-Pwr TRACE[1] 2 3 4 5 6 Marker	Image: Spectrum Analyzer - Swept SA. C SENSE: INT ALIGN AUTO [44:32:33] Marker Z & 17.100000000 MHz Avg Type: Log-Pwr TRU	PM Nov 20, 2020 Marker
PNO: Fest Trig: Free Run Avg Hold IFGsin:Low #Atten: 40 dB	ΔMkr2 18.36 MHz 2	PNC: Fast +>- Trig: Free Run Avg Hold: 100/100 11 IFGainLow #Atten: 40 dB ΔMKr2 17 Ref Offset 4 dB ΔMKr2 17	C.10 MHz Select Marker
10 dB/div Ref 30.00 dBm	0.010 dB	10 dB/div Ref 30.00 dBm	0.181 dB
10.0 2Δ3_ 0.00 3	3.91 dbm		
	Delt	a	-14.65 dBm Delta
400	Fixed		Fixed⊳
-0.0 Center 793.00 MHz	Span 50.00 MHz	Center 763.00 MHz Span	90.00 MHz
#Res BW 300 kHz #VBW 1.0 MHz State MNR MODELTRC SCL X Y FUNCTION FUN 1 N 728.21 MHz 23.018 dBm FUNCTION FUN	Sweep 1.000 ms (1001 pts) O	#Res BW 300 kHz #VBW 1.0 MHz Sweep 1.000 ms MRR MODE TRC SQL X Y FUNCTION FUNCTION	(1001 pts) Off
2 Δ3 f (Δ) 18,36 MHz (Δ) 0.010 dB 3 F f 784.00 MHz (Δ) 0.010 dB 4 - - - - -	Properties	2 Δ3 f (Δ) 17.16 MHz (Δ) -0.181 dB 3 F f 753.10 MHz -14.506 dBm	Properties►
6	Mor	e 8	More
	- 1 of		- 1 of 2
Uplink	STATUS	MBG BTATUS	-
Applicable Standard			
Applicable Standard			
Applicable Standard FCC §2.1046 and §90.219 (e)(1)	gnal boostar must be de	signed for deployments providing a radiated	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a signower not exceeding 5 Watts ERP f	gnal booster must be de	ssigned for deployments providing a radiated	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f	gnal booster must be de for each retransmitted c	signed for deployments providing a radiated	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure	gnal booster must be de for each retransmitted c	esigned for deployments providing a radiated	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure	gnal booster must be de for each retransmitted c	esigned for deployments providing a radiated channel	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2	gnal booster must be de for each retransmitted c 2 to measure the maxim	esigned for deployments providing a radiated shannel	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain,	gnal booster must be de for each retransmitted c 2 to measure the maxin but with the following	esigned for deployments providing a radiated channel	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for	gnal booster must be de for each retransmitted c 2 to measure the maxin but with the following or CW operation, instea	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pos	gnal booster must be de for each retransmitted c 2 to measure the maxin but with the following or CW operation, instea sitive peak detector, inst	esigned for deployments providing a radiated hannel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pos c) Activate the max hold function, i d) Use in acciunction with the guid	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, inst instead of the trace aver	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pos c) Activate the max hold function, i d) Use in conjunction with the guid	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, inst instead of the trace aver lance in 4.5.3.	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pos c) Activate the max hold function, i d) Use in conjunction with the guid	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, inst instead of the trace aver lance in 4.5.3. 1: using a spectrum or s	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sig power not exceeding 5 Watts ERP f Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pos c) Activate the max hold function, i d) Use in conjunction with the guid 4.5.3 Power measurement Method 1 a) Set the frequency span to at least	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, inst instead of the trace aver lance in 4.5.3. 1: using a spectrum or s t 1 MHz.	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a signower not exceeding 5 Watts ERP for Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pose c) Activate the max hold function, if d) Use in conjunction with the guid 4.5.3 Power measurement Method for a) Set the frequency span to at least b) Set RBW = 100 kHz	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, instea instead of the trace aver lance in 4.5.3. 1: using a spectrum or s t 1 MHz.	esigned for deployments providing a radiated hannel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function,	
Applicable Standard FCC §2.1046 and §90.219 (e)(1) The output power capability of a sign power not exceeding 5 Watts ERP for Test Procedure Apply the same guidance as in 3.5.2 for computing the mean EUT gain, a) Configure the signal generator for b) Select the spectrum analyzer pose c) Activate the max hold function, if d) Use in conjunction with the guid 4.5.3 Power measurement Method for a) Set the frequency span to at least b) Set RBW = 100 kHz. c) Set VBW > 3 × PBW	gnal booster must be de for each retransmitted c 2 to measure the maxim but with the following or CW operation, instea sitive peak detector, inst instead of the trace aver lance in 4.5.3. 1: using a spectrum or s t 1 MHz.	esigned for deployments providing a radiated channel num input and output power levels necessary modifications: d of AWGN, tead of the power averaging (rms) detector, raging function, signal analyzer	

- e) Place a marker on the peak of the signal, and record the value as the maximum power.
- f) Repeat step e) but with the EUT in place.
- g) EUT gain may be calculated as described in 4.5.5.

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4.5.5 Calculating amplifier, repeater, or industrial booster gain

NOTE-Sections 90.219 and 2.1033(c) do not require gain test data; inclusion of industrial booster gain

test data in test reports submitted for FCC equipment authorization is optional.

After the input and output power levels have been measured as described in the preceding subclauses, the

gain of the EUT can be determined from:

Gain (dB) = output power (dBm) – input power (dBm).

Report the gain for each authorized operating frequency band, and each test signal stimulus.

Test Data

Temperature	22.4°C	Humidity	53.7%
Test Engineer	Diamond Lu	Test Mode	Transmitting

Mode	Frequency (MHz)	Signal Type	AGC threshold level (dBm)	Signal Level	Input Power (dBm)	Output Power (dBm)	Antenna Gain	ERP (dBm)	Gain (dB)	ERP Limit
	6			Pre-AGC	-24.536	21.547	7.0	26.397	46.083	36.99dBm
Uplink	788.24	CW	-24.5	3dB above AGC	-21.536	21.141	7.0	25.991	42.677	36.99dBm
N.)		N.	Pre-AGC	-44.310	5.661	9.5	12.661	49.971	36.99dBm
Downlink	758.18	CW	-44.3	3dB above AGC	-41.310	5.329	9.5	12.679	46.639	36.99dBm

Note:

ERP= Measured Conducted Output Power (dBm) + Antenna Gain (dBi) - 2.15 (dB) Rated power is 36dBm+/- 1dB.

Keysight Spectrum Analyzer - Swept S/ RF 50 Ω 44 Marker 1 788.23900000	A C SENSE:INT DO MHZ DWG: Wide Trig: Free Run	ALIGN AUTO 10:46:44 AM Nov19, 2020 Avg Type: Log-Pwr TRACE 12 3 4 5 6 Avg1Hold:>100/1100 TYPE M www.ww	Peak Search	Keysight Spectrum Analyzer - Sw RF 50 G Marker 1 788.23900	AC 0000 MHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	10:50:34 AM Nov 19, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWWW	Peak Search
Ref Offset 4 dB	IFGain:Low #Atten: 10 dB	Mkr1 788.239 MHz -24.536 dBm	NextPeak	Ref Offset 4 10 dB/div Ref 30.00	dB dBm	Atten: 40 dB	MI	kr1 788.239 MHz 21.547 dBm	NextPeak
-10.0			Next Pk Right	20.0		<u>_</u>			Next Pk Right
30.0	•		Next Pk Left	0.00					Next Pk Left
50.0			Marker Delta	-10.0					Marker Delta
70.0			Mkr→CF	-30.0					Mkr→CF
0.0	St. Jan Mark	homenour	Mkr→RefLvl	-50.0	wheet here			hanna yahan	Mkr→RefLvi
			More 1 of 2	-60.0				Dram 1 000 Mile	More 1 of 2
Res BW 100 kHz	#VBW 300 kHz	Sweep 1.000 ms (1001 pts)		#Res BW 100 kHz	#VBW 300	0 kHz	Sweep	1.000 ms (1001 pts)	
lsg	Uplink, CW, Pre-A	AGC, Input Power		MSG	Uplink, CW	, Pre-A	GC, Outp	ut Power	
ť	Uplink, CW, Pre-A	AGC, Input Power			Uplink, CW	, Pre-A	GC, Outp	ut Power	

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6.3. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON:OCCUPIED

BANDWIDTH

Applicable Standard

According to FCC §90.219 (e)(4)(ii), There is no change in the occupied bandwidth of the retransmitted signals.

Test Procedure

Connect a signal generator to the input of the EUT.

b) Configure the signal generator to transmit the appropriate test signal associated with the public safety emission designation (see Table 1).

c) Configure the signal level to be just below the AGC threshold (see results from 4.2).

d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

e) Set the spectrum analyzer center frequency to the nominal EUT channel center frequency. The span

range for the spectrum analyzer shall be between $2 \times to 5 \times the EBW$ (or OBW).

f) The nominal RBW shall be 300 Hz for 16K0F3E, and 100 Hz for all other emissions types.

g) Set the reference level of the spectrum analyzer to accommodate the maximum input amplitude level, i.e., the level at f 0 per 4.3.

h) Set spectrum analyzer detection mode to peak, and trace mode to max hold.

i) Allow the trace to fully stabilize.

j) Confirm that the signal is contained within the appropriate emissions mask.

k) Use the marker function to determine the maximum emission level and record the associated frequency.

1) Capture the emissions mask plot for inclusion in the test report (output signal spectral).

m) Measure the EUT input signal power (signal generator output signal) directly from the signal generator using power measurement guidance provided in KDB Publication 971168 [R8] (input signal spectra).

n) Compare the spectral plot of the output signal (determined in step k), to the input signal (determined in step l) to affirm they are similar (in passband and rolloff characteristic features and relative spectral locations).

o) Repeat steps d) to n) with the input signal amplitude set 3 dB above the AGC threshold.

p) Repeat steps b) to o) for all authorized operational bands and emissions types (see applicable regulatory specifications, e.g., Section 90.210).

q) Include all accumulated spectral plots depicting EUT input signal and EUT output signal in the test report, and note any observed dissimilarities.

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Test Data

Temperature	22.4°C	Humidity	53.7%
Test Engineer	Diamond Lu	Test Mode	Transmitting
	(xC)	(<u>k</u> G')	(xO*)

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Mode	Signal Type	Signal Level	99% Occuj (1	pied Bandwidth MHz)	26 dB E (N	3andwidth 1Hz)
	71		Input	Output	Input	Output
		Pre-AGC	4.3551	4.3198	4.995	4.960
Uplink	AWGN	3dB above AGC	4.3486	4.3151	4.995	4.959
З С		Pre-AGC	4.4227	4.3820	5.025	4.961
Downlink	AWGN	3dB above AGC	4.3841	4.3740	5.003	4.965



Keysight Spectrum Analyzer - Occupied BW Key 59 0, AC Ref Value -20.00 dBm Ectatod cm FA	SENSE:INT ALIGN AUTO 109/25:00 AM Nov 19, 200 Inter Freq: 763.00000 MHz Radio Std: None Radio Std: None fg: Free Run Avg Hold:>10/10 Radio Device: BTS	20 Trace/Detector Ref Value 20.00 dBm	SENSE:INT ALIGN AUTO (9+20+64 M Nov 19, Center Freq: 763.00000 MHz Radio Std: None Center Freq: 763.00000 MHz Radio Std: None Radio Std: None Trig: Free Run Avg Hold>1010 Radio Std: None Enabled rec: Atten: 30 dB Avg Hold>1010	2020 Trace/Detec
10 dB/div Ref -20.00 dBm		Clear Write 10 dB/div Ref 20.00 dBm Average 300		Ave Max
Gener 763 MHZ #Res BW 100 kHz Occupied Bandwidth 4.4227 MHz Transmit Freq Error 1.054 kHz x dB Bandwidth 5.025 MHz	#VBW 300 kHz Span 10 kH Total Power -40.0 dBm OBW Power 99.00 % x dB -26.00 dB	Min Hold Min Hold Detector <u>Auto</u> Man Auto Man Min Hold Detector Average ► <u>Auto</u> Man X dB Bandwidth	#VBW 300 kHz Span 10 m Sweep 1.267 Total Power 10.2 dBm 820 MHz - -33.793 kHz OBW Power 99.00 % 4.961 MHz x dB -26.00 dB	Min Min Auto
MSG Downlink, Krysight Spectrum Analyzer - Occupied BW	AWGN, Pre-AGC, Input	too Down	nlink, AWGN, Pre-AGC, Output	
Ref Value -20.00 dBm Fill #FGain:Low If 10 dBidiv Ref -20.00 dBm 10 dBidiv Ref -20.00 dBm	Radio Stat: None Radio Stat: None Radio Device: BTS	Ref Value 20.00 dBm Image: Sector of the	FGainLow Conter Freq 78.00000 MHz Radio Stat: Kone FGainLow Addition 30 dB Radio Device: BTS Radio Device: BTS #VBW 300 kHz Symptotic Sweep 1.267	S Clear V Ave Maxi
Occupied Bandwidth 4.3871 MHz Transmit Freq Error 42 Hz x dB Bandwidth 5.003 MHz Moor Handwidth 5.003 MHz	Total Power -37.1 dBm OBW Power 99.00 % x dB -26.00 dB	Detector Average> Auto Occupied Bandwidth Auto Man Image: State of the stat	Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB arxnus Iink, AWGN, Above-AGC, Outpu	Auto Detu Aver
Occupied Bandwidth 4.3871 MHz Transmit Freq Error 42 Hz x dB Bandwidth 5.003 MHz M85 Downlink, A	Total Power -37.1 dBm OBW Power 99.00 % x dB -26.00 dB	Detector Average Occupied Bandwidth Auto Man Man Transmit Freq Error x dB Bandwidth Man Man	Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB	Auto
Occupied Bandwidth 4.3871 MHz Transmit Freq Error 42 Hz x dB Bandwidth 5.003 MHz Downlink, A	Total Power -37.1 dBm OBW Power 99.00 % x dB -26.00 dB wratus WGN, Above-AGC, Input	Detector Occupied Bandwidth Auto Man Auto Man Man Xerage* Man Xerage* Man Xerage* Man Xerage* Man Man Man Man <td>Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB</td> <td>Auto Dete Aver Auto</td>	Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB	Auto Dete Aver Auto
Occupied Bandwidth 4.3871 MHz Transmit Freq Error 42 Hz x dB Bandwidth 5.003 MHz Mos Downlink, A	Total Power -37.1 dBm OBW Power 99.00 % x dB -26.00 dB wrang WGN, Above-AGC, Input	Detector Occupied Bandwidth Auto Man Auto Man Image: State of the state o	Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB	Auto
Occupied Bandwidth 4.3871 MHz Transmit Freq Error 42 Hz x dB Bandwidth 5.003 MHz Downlink, A	Total Power 99.00 % x dB -26.00 dB	Detector Occupied Bandwidth Auto Man Auto Man Man Transmit Freq Error x dB Bandwidth Down	Total Power 9.48 dBm 740 MHz -30.081 kHz OBW Power 99.00 % 4.965 MHz x dB -26.00 dB Ink, AWGN, Above-AGC, Outpu	Auto Aver

Emission Mask B

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6.4. OUT-OF-BAND/BLOCK EMISSIONS(INCLUDING INTERNODULATION PRODUCTS)

Applicable Standards

According to FCC §90.219 (e)(3) Spurious emissions from a signal booster must not exceed -13 dBm within any 100 kHz measurement bandwidth

Test Procedure

a) Connect a signal generator to the input of the EUT.

If the signal generator is not capable of producing two independent modulated carriers

simultaneously, then two discrete signal generators can be connected, with an appropriate combining network to support the two-signal test.

b) Configure the two signal generators to produce CW on frequencies spaced consistent with 4.7.1, with amplitude levels set to just below the AGC threshold (see 4.2). Set the signal generator amplitudes so that the power from each into the EUT is equivalent.

- c) Connect a spectrum analyzer to the EUT output.
- d) Set the span to 100 kHz.
- e) Set RBW = 300 Hz with VBW \ge 3 × RBW.
- f) Set the detector to power averaging (rms).
- g) Place a marker on highest intermodulation product amplitude.
- h) Capture the plot for inclusion in the test report.
- i) Repeat steps c) to h) with the composite input power level set to 3 dB above the AGC threshold.
- j) Repeat steps b) to i) for all operational bands.

Test Data

Temperature	22.4°C	Humidity	53.7%
Test Engineer	Diamond Lu	Test Mode	Transmitting





6.5. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

According to FCC 90.219 (e)(3) Spurious emissions from a signal booster must not exceed -13 dBm within any 100 kHz measurement bandwidth

Test Procedure

a) Connect a signal generator to the input of the EUT.

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- b) Configure the signal generator to produce a CW signal.
- c) Set the frequency of the CW signal to the center channel of the EUT passband.
- d) Set the output power level so that the resultant signal is just below the AGC threshold (see 4.2).
- e) Connect a spectrum analyzer to the output of the EUT, using appropriate attenuation as necessary.
- f) Set the RBW = 100 kHz. (i.e., for 30 MHz to 1 GHz PLMRS and/or PSRS booster devices)
- g) Set the VBW = $3 \times RBW$.
- h) Set the Sweep time = auto-couple.
- i) Set the detector to PEAK.

j) Set the spectrum analyzer start frequency to 30 MHz (or the lowest radio frequency signal generated in the EUT, without going below 9 kHz if the EUT has additional internal clock frequencies), and the stop frequency to $10 \times$ the highest allowable frequency of the EUT passband.

k) Select MAX HOLD, and use the marker peak function to find the highest emission(s) outside the passband. (This could be either at a frequency lesser or greater than the passband frequencies.)

1) Capture a plot for inclusion in the test report.

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m) Repeat steps c) to l) for each authorized frequency band/block of operation.

Test Data

Temperature	22.4°C	Humidity	53.7%	
Test Engineer	Diamond Lu	Test Mode	Transmitting	Š)
			B	age 19 of 2

Regular Section Address - Senge SA SENSE: INT ALIGN AUTO 16:36:58 AM Nov15, 2020 arker 1 657.590000000 MHz SENSE: INT Avg Type: Log-Perr Trace 2 34:5 6 Trig: Free Run Avg Type: Log-Perr Trig: Set Au Nov15, 2020	Peak Search	Bit Knopski Spectrum Andyser: Svept SA Bit Knopski Spectrum Andyser: Svept SA Bit Knopski Spectrum Andyser: Svept SA Marker 1 5.743000005270 GHz Avag Type: Log-Purv PNO: Fast: Or Trig: Free Rum Avag Type: Log-Purv Trig: Free Rum Avag Type: Log-Purv	eak Search
iFGainLow #Atten: 40 dB Del[P ANNA Ref Offset 4 dB Mkr1 657.59 MHz > dB/div Ref 30.00 dBm -45.911 dBm	NextPeak	IFGaint.ow #Atten: 40 dB CET P MANN Ref Offset 4 dB Mkr1 5.743 GHz 10 dB/div, Ref 30.00 dBm -31.278 dBm	NextPeak
	Next Pk Right	Log	ext Pk Right
00	Next Pk Left	100	Next Pk Left
	Marker Delta	300 -000	Vlarker Delta
art 30.0 MHz Stop 1.0000 GHz es BW 100 kHz #VBW 300 kHz Sweep 92.73 ms (1001 pts)	Mkr→CF	400 Start 1.000 GHz Stop 10.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 15.00 ms (1001 pts)	Mkr→CF
R VODETRCI SCI X Y FUNCTION I FUNCTION WOTH FUNCTION VALUE > N 657.59 MHz 45,911 dBm	Mkr→RefLvi	MRR MODE TRC: X Y Function Function width Function	/lkr→RefLvl
	More 1 of 2		More 1 of 2
STATUS		ASG STATUS	
Uplink (30M-1G)		Uplink (1G-10G)	
Keygidi Stratum Andrer. Svergi SA Keygidi Stratum Andrer. Svergi SA ALION AUTO 10.38:25 AM Hov 19, 2020 Arker 1 542.160000000 MHz Frac El 23 4 5 6 Frac El 23 4 5 6 Avg Type: Log-Pwr Trace El 23 4 5 6 PROC Feat FrainLow Frac El 24 A 6 dB Avg Type: Log-Pwr Trace El 23 4 5 6	Peak Search	Image: Space	eak Search
Ref Offset 4 dB Mkr1 542.16 MHz Ref 30.00 dBm -45.709 dBm -45.709 dBm	Next Peak	Ref Offset 4 dB Mkr1 7.120 GHz 10 #Bidiv Ref 30.00 dBm -32.878 dBm	Next Peak
	Next Pk Right	N N N N N N N N N N N N N N N N N N N	ext Pk Right
	Next Pk Left	100 1000 200 1000 300 1000 00000000000000000000000	Next Pk Left
	Marker Delta		Varker Delta
art 30.0 MHz Stop 1.0000 GHz tes BW 100 kHz #VBW 300 kHz Sweep 92.73 ms (1001 pts) R MORE TRCI SCL X Y FUNCTION RUNCTION MALE A	Mkr→CF	Start 1.000 GHz Stop 10.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 15.00 ms (1001 pts) MR MODE TRC SCL X Y FUNCTION FUNCTION VALUE	Mkr→CF
N I 044,10 MHZ 40,709 UDHI	Mkr→RefLvl	1 N T 7.120 GR2 S2.8/8 00m 2 3 4 5 5 6 6 7 7 120 GR2 S2.8/8 00m 4 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	/lkr→RefLvl
	More 1 of 2		More 1 of 2
Downlink(30M-1G)		MEG Downlink(1-10G)	
	6		(
5.6 RADIATED SPURIOUS EMIS	SSION	s C	
according to FCC §90.219 (e)(3) Spurious emission within any 100 kHz measurement bandwidth	ons from a	signal booster must not exceed -13 dBm	
Test Procedure			
.EUT was placed on a 1.50 meter high non-condu eceiving antenna was placed on the antenna mast 3	ctive stan 3 meters f ere maxim	d at a 3 meter test distance from the receive antenna. A rom the EUT for emission measurements. The heigh ized at each frequency by rotating the EUT through 36	t of 0°and

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spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver. 3.The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver RBW=1MHz,VBW=3MHz for above 1GHz,RBW=120KHz,VBW=300KHz for below 1GHz,, And the maximum value of the receiver should be recorded as (Pr).

4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization. 5.A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) and the Substitution Antenna Gain (Ga) should be recorded after test.

The measurement results are obtained as described below:

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Power(EIRP)=PMea-Pcl+Ga

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

7.ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP - 2.15 dBi.

8.In order to make sure test results more clearly, we set frequency range as follows table:

Frequency	Channel	Frequency Range	Verdict
	Low	9KHz -8GHz	PASS
LTE FDD Band 14	Middle	9KHz -8GHz	PASS
	High	9KHz -8GHz	PASS

Test Data

$(2G^{*})$	$(2\mathbf{G}^{*})$	(2G)	$(2\mathbf{G}^{*})$
Temperature	21.8°C	Humidity	53.6%
Test Engineer	Diamond Lu	Test Mode	Transmitting



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Uplink, Test Frequency 790.5MHz

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Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
114.3	-45.69	4.87	3.00	3.12	2.15	-49.59	-13.00	H
1581.3	-44.31	5.74	3.00	10.23	2.15	-41.97	-13.00	Н
2371.8	-55.46	6.65	3.00	12.03	2.15	-52.23	-13.00	Н
156.3	-43.20	4.94	3.00	3.34	2.15	-46.95	-13.00	V
1581.3	-43.63	5.74	3.00	10.23	2.15	-41.29	-13.00	V
2371.8	-49.37	6.65	3.00	12.03	2.15	-46.14	-13.00	V

Uplink, Test Frequency 793.0MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
135.2	-42.17	4.77	3.00	3.21	2.15	-45.88	-13.00	Н
1586.3	-45.39	5.81	3.00	10.27	2.15	-43.08	-13.00	Н
2379.2	-50.71	6.71	3.00	12.05	2.15	-47.52	-13.00	Н
158.2	-40.55	4.62	3.00	3.36	2.15	-43.96	-13.00	V
1586.3	-45.79	5.81	3.00	10.27	2.15	-43.48	-13.00	V
2379.2	-55.44	6.71	3.00	12.05	2.15	-52.25	-13.00	V

Uplink, Test Frequency 795.5MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
146.2	-45.34	4.21	3.00	3.23	2.15	-48.47	-13.00	Н
1591.3	-40.81	5.92	3.00	10.31	2.15	-38.57	-13.00	Н
2387.0	-48.10	6.82	3.00	12.32	2.15	-44.75	-13.00	H
203.5	-42.38	4.31	3.00	3.21	2.15	-45.63	-13.00	V
1591.3	-41.57	5.92	3.00	10.31	2.15	-39.33	-13.00	V
2387.0	-55.53	6.82	3.00	12.32	2.15	-52.18	-13.00	V

Downlink, Test Frequency 760.5MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	Ga Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
156.3	-41.44	4.32	3.00	3.19	2.15	-44.72	-13.00	Н
1521.3	-44.85	5.12	3.00	9.94	2.15	-42.18	-13.00	Н
2281.8	-50.78	6.32	3.00	11.86	2.15	-47.39	-13.00	Н
203.5	-40.09	4.03	3.00	3.52	2.15	-42.75	-13.00	V
1521.3	-41.97	5.12	3.00	9.94	2.15	-39.30	-13.00	V
2281.8	-47.50	6.32	3.00	11.86	2.15	-44.11	-13.00	V

Downlink, Test Frequency763.0MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
145.6	-51.35	4.29	3.00	3.98	2.15	-53.81	-13.00	H
1526.3	-44.00	5.23	3.00	10.03	2.15	-41.35	-13.00	Н
2289.3	-50.40	5.32	3.00	12.00	2.15	-45.87	-13.00	Н
193.2	-43.05	4.32	3.00	3.63	2.15	-45.89	-13.00	V
1526.3	-43.30	5.23	3.00	10.03	2.15	-40.65	-13.00	V
2289.3	-48.14	5.32	3.00	12.00	2.15	-43.61	-13.00	V

Downlink, Test Frequency 765.5MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	Ga Antenna Gain(dB)	Convert Factor	Peak EIRP (dBm)	Limit (dBm)	Polarization
126.3	-55.72	4.29	3.00	3.36	2.15	-58.80	-13.00	Н
1531.3	-43.39	5.31	3.00	10.04	2.15	-40.81	-13.00	Н
2297.0	-51.11	6.41	3.00	11.99	2.15	-47.68	-13.00	Н
231.3	-45.22	4.62	3.00	3.66	2.15	-48.33	-13.00	V
1531.3	-44.35	5.31	3.00	10.04	2.15	-41.77	-13.00	V
2297.0	-55.99	4.63	3.00	3.85	2.15	-58.92	-13.00	V

Note:For Outdoor Antenna (SYN-BY-9D),Indoor Antenna(SYN-IPA-8D);Outdoor Antenna

(SYN-OPA-8D), Indoor Antenna(SYN-CA-3D) were estimated , the report recorded the worst result of

Outdoor Antenna (SYN-BY-9D), Indoor Antenna (SYN-IPA-8D)

6.7 NOISE FIGURE MEASUREMENTS

Applicable Standard

Section 90.219(e)(2) limits the noise figure of a signal booster to \leq 9 dB in either direction. The following discussion provides guidance for demonstrating compliance with this requirement.

Test Procedure

- a) A spectrum analyzer was connected to output port
- b) The input was terminated
- c) The spectrum analyzer was set to 100 trace average in the RMS average mode
- d) A peak reading was recorded
- e) The noise figure was calculated using the following formula
- NF= Max reading (-174dBm/Hz +10*log 10 (RBW)+ Booster gain)
- Note: 174= Thermal noise for 1Hz RBW at room temperature
- RBW= Resolution Bandwidth of Spectrum Analyzer in Hz

Temp	erature			22.4°C	Hu	midity	53.7%)
Test Engineer		Diamond Lu		Tes	Test Mode		ting	
Analyzer Settin		Setting	gs	Max Reading	Booster Gain	Thermal Noise	Noise Figure	Limit (dB)
Frequenc (N	y R (Marka) (N	AHz)	VBW (MHz)	(dBm/MHZ)	(dB)	(dBm/MHZ)) (aB)	
7	93.0	1	3	-63.036	46.083	-11	4 4.881	9
7	63.0	1	3	-60.593	49.971	-11	4 3.436	9
At Spectrum Analyzer - Same tA Pr 1788.750000000 M Ref Offset 0.5 dB Ref 0.00 dBm	HZ PHO: Fest FGaincLow Trig: Free Run Atten: 10 dB	Avg Ty Avg Ho AvgHo	MIN MID (0200) PARMS	19Hwy 7,200 Peak Search Tree Docard Search Tree Docard Search 19Hwy 7,200 Peak Search Next Pe 0.36 dBm Next Pk Rig Next Pk Rig Next Pk Rig Marker De Marker De Mkr→Ref L	Image: spectrum back product product spectrum back product spectr	m Singlish 0000000 MH2 PRO: Feat Trig: F IFGeinLow 20 0 Bm 0 0 Bm 0 0 Bm 0 0 Bm 0 0 Bm 0 0 0 m 0 m	SEXELINT AVE TYPE RMS AvgType RMS AvgTHold=100100 ID dB MKr	Next Pk Next Pk 1759.45 MHz Next Pk -60.593 dBm Next Pk Next Pk Next Pk -60.593 dBm Marker D -60.593 dBm Mkr-
r 793.00 MHz BW 1.0 MHz	#VBW 3.0 MHz*		Spar Sweep 1.000 m	1 0 50.00 MHz s (1001 pts)	f ² Center 763.00 MH #Res BW 1.0 MH	lz #VBW 3.0 Mł	Iz* Sweep 1.00	Span 50.00 MHz 1 0 ms (1001 pts)
	U	plink	STATUS		MSG		Downlink	
(\mathcal{S})								

7. Test Instruments

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Name	Model No.	Manufacturer	Date of Cal.	Due Date	
EMI Test Receiver	ESIB7	R&S	Jul. 28, 2020	Jul. 27, 2021	
Spectrum Analyzer	N9020A	Agilent	Sep. 11, 2020	Sep. 10, 2021	
Amplifier	8447D	HP	Sep. 08, 2020	Sep. 08, 2021	
Amplifier	EM30265	EM Electronics Corporation CO.,LTD	Sep. 08, 2020	Sep. 08, 2021	
Broadband Antenna	VULB9163	Schwarzbeck	Sep. 06, 2020	Sep. 05, 2021	
Horn Antenna	BBHA 9120D	Schwarzbeck	Sep. 06, 2020	Sep. 05, 2021	
Coax cable (9KHz-40GHz)	RE-high-02	ТСТ	Sep. 08, 2020	Sep. 07, 2021	
Coax cable (9KHz-40GHz)	RE-high-04	TCT	Sep. 08, 2020	Sep. 07, 2021	
Loop antenna	ZN30900A	ZHINAN	Sep. 11, 2020	Sep. 10, 2021	
Signal Generator	N5182A	Agilent	Sep. 11, 2020	Sep. 10, 2021	
Signal Generator	Agilent	E4421B	Jul. 27, 2020	Jul. 26, 2021	
RF Combiner	SUNVNDN	SUD-CS0800	Sep. 11, 2020	Sep. 10, 2021	
Attenuator	50FP-006-H3	JFW	Sep. 11, 2020	Sep. 10, 2021	
Band Pass Filter	4CS10- 781.5/E12.2- O/O	N/A	Sep. 11, 2020	Sep. 10, 2021	
Band Pass Filter	4CS10- 751.5/E12-O/O	N/A	Sep. 11, 2020	Sep. 10, 2021	
1 dB step Attenuator	8494B	N/A	Sep. 11, 2020	Sep. 10, 2021	
10dB step Attenuator	8496B	N/A	Sep. 11, 2020	Sep. 10, 2021	
RF Coupler	722-10-1.500V	N/A	Sep. 11, 2020	Sep. 10, 2021	
Band Pass Filter	4CS10- 781.5/E12.2- O/O	N/A	Sep. 11, 2020	Sep. 10, 2021	

