TEST REPORT

FCC MPE Test for Clear Call
Certification

APPLICANT
GS Instech Co., Ltd.

REPORT NO.
HCT-RF-2011-FC031-R1

DATE OF ISSUE
December 15, 2020

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Additional Model
-

Applicant	**GS Instech Co., Ltd.**
	70, Gilpa-ro 71beon-gil, Nam-gu, Inchen, Korea
Product Name	Consumer Cellular Booster
Model Name	Clear Call
FCC ID	U88-CCQ13

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	November 27, 2020	Initial Release
1	December 15, 2020	Revised the results.

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

RF Exposure Statement

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposures				
0.3 - 1.34……………………	614	1.63	*(100)	30
1.34 - 30………………………	824/f	2.19/f	*(180/ f²)	30
30 - 300………………………	27.5	0.073		30
300 - 1500……………………	…………	…………	0.2	30
1500 - 100.000………………	…………	…………	f/1500	30
			1.0	

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

3. Results

3.1 MPE calculation for standalone operations

- Lower 700 MHz – Uplink

Max Peak output Power at antenna input terminal	22.00	dBm
Max Peak output Power at antenna input terminal	158.49	mW
Prediction distance	170.00	cm
Prediction frequency	700.50	MHz
Coupled Gain(typical)	5.63	dBi
Coupled Gain(numeric)	3.66	-
Power density at prediction frequency(S)	0.0016	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4670	mW/cm^2

- Lower 700 MHz – Downlink

Max Peak output Power at antenna input terminal	-1.00	dBm
Max Peak output Power at antenna input terminal	0.79	mW
Prediction distance	20.00	cm
Prediction frequency	730.50	MHz
Coupled Gain(typical)	2.37	dBi
Coupled Gain(numeric)	1.73	-
Power density at prediction frequency(S)	0.0003	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4870	mW/cm^2

- Upper 700 MHz – Uplink

Max Peak output Power at antenna input terminal	22.00	dBm
Max Peak output Power at antenna input terminal	158.49	mW
Prediction distance	170.00	cm
Prediction frequency	778.50	MHz
Coupled Gain(typical)	5.37	dBi
Coupled Gain(numeric)	3.44	-
Power density at prediction frequency(S)	0.0015	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5190	mW/cm^2

- Upper 700 MHz – Downlink

Max Peak output Power at antenna input terminal	-1.00	dBm
Max Peak output Power at antenna input terminal	0.79	mW
Prediction distance	20.00	cm
Prediction frequency	748.50	MHz
Coupled Gain(typical)	2.37	dBi
Coupled Gain(numeric)	1.73	-
Power density at prediction frequency(S)	0.0003	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4990	mW/cm^2

- Cellular – Uplink

Max Peak output Power at antenna input terminal	22.00	dBm
Max Peak output Power at antenna input terminal	158.49	mW
Prediction distance	170.00	cm
Prediction frequency	826.50	MHz
Coupled Gain(typical)	5.23	dBi
Coupled Gain(numeric)	3.33	-
Power density at prediction frequency(S)	0.0015	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5510	mW/cm^2

- Cellular – Downlink

Max Peak output Power at antenna input terminal	4.00	dBm
Max Peak output Power at antenna input terminal	2.51	mW
Prediction distance	20.00	cm
Prediction frequency	871.50	MHz
Coupled Gain(typical)	2.07	dBi
Coupled Gain(numeric)	1.61	-
Power density at prediction frequency(S)	0.0008	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5810	mW/cm^2

- Broadband PCS – Uplink

Max Peak output Power at antenna input terminal	23.00	dBm
Max Peak output Power at antenna input terminal	199.53	mW
Prediction distance	170.00	cm
Prediction frequency	1852.50	MHz
Coupled Gain(typical)	5.15	dBi
Coupled Gain(numeric)	3.27	-
Power density at prediction frequency(S)	0.0018	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- Broadband PCS – Downlink

Max Peak output Power at antenna input terminal	3.00	dBm
Max Peak output Power at antenna input terminal	2.00	mW
Prediction distance	20.00	cm
Prediction frequency	1932.50	MHz
Coupled Gain(typical)	0.38	dBi
Coupled Gain(numeric)	1.09	-
Power density at prediction frequency(S)	0.0004	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- AWS-1 – Uplink

Max Peak output Power at antenna input terminal	25.00	dBm
Max Peak output Power at antenna input terminal	316.23	mW
Prediction distance	170.00	cm
Prediction frequency	1712.50	MHz
Coupled Gain(typical)	5.50	dBi
Coupled Gain(numeric)	3.55	-
Power density at prediction frequency(S)	0.0031	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- AWS-1 – Downlink

Max Peak output Power at antenna input terminal	1.00	dBm
Max Peak output Power at antenna input terminal	1.26	mW
Prediction distance	20.00	cm
Prediction frequency	2112.50	MHz
Coupled Gain(typical)	0.50	dBi
Coupled Gain(numeric)	1.12	-
Power density at prediction frequency(S)	0.0003	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

3.2 MPE calculation for simultaneous transmission operations

- Lower 700 MHz – Uplink

Max Peak output Power at antenna input terminal	29.21	dBm
Max Peak output Power at antenna input terminal	833.68	mW
Prediction distance	170.00	cm
Prediction frequency	700.50	MHz
Coupled Gain(typical)	5.63	dBi
Coupled Gain(numeric)	3.66	-
Power density at prediction frequency(S)	0.0084	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4670	mW/cm^2

- Lower 700 MHz – Downlink

Max Peak output Power at antenna input terminal	8.17	dBm
Max Peak output Power at antenna input terminal	6.56	mW
Prediction distance	20.00	cm
Prediction frequency	730.50	MHz
Coupled Gain(typical)	2.37	dBi
Coupled Gain(numeric)	1.73	-
Power density at prediction frequency(S)	0.0023	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4870	mW/cm^2

- Upper 700 MHz – Uplink

Max Peak output Power at antenna input terminal	29.21	dBm
Max Peak output Power at antenna input terminal	833.68	mW
Prediction distance	170.00	cm
Prediction frequency	778.50	MHz
Coupled Gain(typical)	5.37	dBi
Coupled Gain(numeric)	3.44	-
Power density at prediction frequency(S)	0.0079	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5190	mW/cm^2

- Upper 700 MHz – Downlink

Max Peak output Power at antenna input terminal	8.17	dBm
Max Peak output Power at antenna input terminal	6.56	mW
Prediction distance	20.00	cm
Prediction frequency	748.50	MHz
Coupled Gain(typical)	2.37	dBi
Coupled Gain(numeric)	1.73	-
Power density at prediction frequency(S)	0.0023	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.4990	mW/cm^2

- Cellular – Uplink

Max Peak output Power at antenna input terminal	29.21	dBm
Max Peak output Power at antenna input terminal	833.68	mW
Prediction distance	170.00	cm
Prediction frequency	826.50	MHz
Coupled Gain(typical)	5.23	dBi
Coupled Gain(numeric)	3.33	-
Power density at prediction frequency(S)	0.0077	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5510	mW/cm^2

- Cellular – Downlink

Max Peak output Power at antenna input terminal	8.17	dBm
Max Peak output Power at antenna input terminal	6.56	mW
Prediction distance	20.00	cm
Prediction frequency	871.50	MHz
Coupled Gain(typical)	2.07	dBi
Coupled Gain(numeric)	1.61	-
Power density at prediction frequency(S)	0.0021	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	0.5810	mW/cm^2

- Broadband PCS – Uplink

Max Peak output Power at antenna input terminal	29.21	dBm
Max Peak output Power at antenna input terminal	833.68	mW
Prediction distance	170.00	cm
Prediction frequency	1852.50	MHz
Coupled Gain(typical)	5.15	dBi
Coupled Gain(numeric)	3.27	-
Power density at prediction frequency(S)	0.0075	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- Broadband PCS – Downlink

Max Peak output Power at antenna input terminal	8.17	dBm
Max Peak output Power at antenna input terminal	6.56	mW
Prediction distance	20.00	cm
Prediction frequency	1932.50	MHz
Coupled Gain(typical)	0.38	dBi
Coupled Gain(numeric)	1.09	-
Power density at prediction frequency(S)	0.0014	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- AWS-1 – Uplink

Max Peak output Power at antenna input terminal	29.21	dBm
Max Peak output Power at antenna input terminal	833.68	mW
Prediction distance	170.00	cm
Prediction frequency	1712.50	MHz
Coupled Gain(typical)	5.50	dBi
Coupled Gain(numeric)	3.55	-
Power density at prediction frequency(S)	0.0081	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- AWS-1 – Downlink

Max Peak output Power at antenna input terminal	8.17	dBm
Max Peak output Power at antenna input terminal	6.56	mW
Prediction distance	20.00	cm
Prediction frequency	2112.50	MHz
Coupled Gain(typical)	0.50	dBi
Coupled Gain(numeric)	1.12	-
Power density at prediction frequency(S)	0.0015	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.0000	mW/cm^2

- Uplink

Band	MPE Ratio (Power density / Limit)	Sum of MPE Ratio	
Lower 700 MHz	0.0180	0.0628	≤ 1
Upper 700 MHz	0.0152		
Cellular	0.0139		
Broadband PCS	0.0075		
AWS-1	0.0081		

* Note
  1. The result of each band was applied to the worst value.
  2. MPE ratios are calculated as
     [(Power density1 / MPE Limit) + [(Power density2 / MPE Limit) + …] ≤ 1

- Downlink

Band	MPE Ratio (Power density / Limit)	Sum of MPE Ratio	
Lower 700 MHz	0.0046	0.0156	≤ 1
Upper 700 MHz	0.0045		
Cellular	0.0036		
Broadband PCS	0.0014		
AWS-1	0.0015		

* Note
  1. The result of each band was applied to the worst value.
  2. MPE ratios are calculated as

[(Power density1 / MPE Limit) + [(Power density2 / MPE Limit) + …] ≤ 1