FCC Test Report

Report No.:AGC03576190601FE07

FCC ID	:	2ATSO-HYP10
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Portable Translator
BRAND NAME	:	World Speak
MODEL NAME	:	HYP10
APPLICANT	:	King Jim Co., Ltd.
DATE OF ISSUE	:	July 29, 2019
STANDARD(S)	:	FCC Part 22 Rules FCC Part 24 Rules FCC Part 27 Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 29, 2019	Valid	Initial Release

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1.VERIFICATION OF COMPLIANCE

Applicant	King Jim Co., Ltd.
Address	10-18,Higashi-kanda 2-chome Chiyoda-ku,Tokyo,Japan
Manufacturer	Travis GT b.v.
Address	Stationsplein 45, 3013 AK Rotterdam, The Netherlands, Rotterdam, Netherlands
Factory	SHENZHEN HUNGPHONE TECHNOLOGY CO., LTD
Address	F3-4, Block B6, XuJingChang Industry Park, Fuyong, Bao'an, Shenzhen,China
Product Designation	Portable Translator
Brand Name	World Speak
Test Model	HYP10
Date of test	June 18, 2019~July 29, 2019
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance(Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA-603-E-2016. The sample tested as described in this report is in compliance with the FCC Rules Part 24 and 27. The test results of this report relate only to the tested sample identified in this report.

Prepared By

Donjon Huang
(Project Engineer)
July 22, 2019

Reviewed By

Max Zhang
(Reviewer)
July 22, 2019

Approved By

Forrest Lei
(Authorized Officer)
July 22, 2019

2. GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Radio System Type:	LTE	
Frequency Bands:	☒FDD Band 2 ☒FDD Band 5 ☒FDD Band 7 ☒FDD Band 12 ☒FDD Band 17 ☒TDD Band 40 ☒TDD Band 41 (U.S. Bands) ☒FDD Band 1 ☒FDD Band 3 ☒FDD Band 8 ☒FDD Band 19 ☒FDD Band 20 ☒FDD Band 28 ☒TDD Band 38 ☒TDD Band 39 (Non-U.S. Bands)	
Frequency Range	LTE Band 2	Transmission (TX): 1850 to 1909.9 MHz
		Receiving (RX): 1930 to 1989.9 MHz
	LTE Band 5	Transmission (TX): 824 to 848.9 MHz
		Receiving (RX): 869 to 893.9 MHz
	LTE Band 7	Transmission (TX): 2500 to 2569.9MHz
		Receiving (RX): 2620 to 2689.9MHz
	LTE Band 12	Transmission (TX): 699 to 715.9MHz
		Receiving (RX): 729 to 745.9MHz
	LTE Band 17	Transmission (TX): 704 to 715.9MHz
		Receiving (RX): 734 to 745.9MHz
	LTE Band 40	Transmission (TX): 2300 to 2399.9MHz
		Receiving (RX): 2300 to 2399.9MHz
	LTE Band 41	Transmission (TX): 2535 to 2655MHz
		Receiving (RX): 2535 to 2655MHz
Supported Channel Bandwidth	LTE Band 2	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
	LTE Band 5	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz
	LTE Band 7	☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
	LTE Band 12	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz
	LTE Band 17	☒ 5 MHz ☒ 10 MHz
	LTE Band 40	☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
	LTE Band 41	☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
Hardware Version	F01	
Software Version	V1.0.0	
Antenna:	PIFA Antenna	
Type of Modulation	QPSK/16QAM	
Antenna gain:	Band 2: 1.16dBi; Band 5: 1.11dBi; Band 7: 1.22dBi; Band 12:1.13dBi;	

	Band 17:1.15dBi; Band 40:1.25dBi; Band 41:1.26dBi
Diversity Antenna gain:	Band 2: 1.13dBi; Band 5: 1.09dBi; Band 7: 1.20dBi; Band 12:1.05dBi; Band 17:1.11dBi; Band 40: 1.23dBi; Band 41:1.23dBi
Power Supply:	DC 3.8V by battery
Single Card:	GSM/WCDMA/LTE Card Slot
Power Class	3
Extreme Vol. Limits:	DC3.23V to 4.35V (Normal: 3.8V)
Temperature range	-10℃ to +40℃
Note1: The High Voltage DC4.35V and Low Voltage DC3.23V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage..	

2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID:2ATSO-HYP10** , filing to comply with the FCC Part 22, Part 24 and Pant 27 requirements

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2.4 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-E-2016, and FCC KDB 971168 D01 Power Means License Digital Systems V03R01.

2.5 TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong,China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

ALL TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.12, 2019	Jun.11, 2020
LISN	R&S	ESH2-Z5	100086	Aug.28, 2018	Aug.27, 2019
TEST RECEIVER	R&S	ESCI	10096	Jun.12, 2019	Jun.11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.20, 2018	Dec.18, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.21, 2017	Sep.20, 2019
preamplifier	ChengYi	EMC184045SE	980508	Oct. 31, 2018	Oct. 30, 2019
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.17, 2019	May.16, 2021
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.12, 2019	Jun.11, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2019
SIGNAL ANALYZER	Agilent	N9020A	MY52090123	Sep. 20, 2018	Sep. 19, 2019
USB Wideband Power Sensor	Agilent	U2021XA	MY54110007	Sep. 20, 2018	Sep. 19, 2019
Wireless communication test	R&S	CMW500	120909	July 13, 2018	July 12, 2019
Wireless communication test	R&S	CMW500	120909	July 11, 2019	July 10, 2020
Power Splitter	Agilent	11636A	34	Jun.12, 2019	Jun.11, 2020
Attenuator	JFW	50FHC-006-50	N/A	Jun.12, 2019	Jun.11, 2020

2.5 SPECIAL ACCESSORIES

The battery was supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

3.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted output power	2.1046/22.913(a)(2)/24.232(c)/ 27.50(d)(4)/ 27.50(h)(2)
		Radiated output power	
2	Peak-to-Average Ratio	Peak-to-Average Ratio	24.232(d)
3	Spurious Emission	Conducted spurious emission	2.1051/22.917(a)/24.238(a) 27.53(h)/ 27.53(g)
		Radiated spurious emission	
4	Frequency Stability		2.1055/22.355/24.235/27.54
5	Occupied Bandwidth		2.1049 (h)(i)
6	Band Edge		2.1051/22.917(a)/24.238(a) 27.53(h)/ 27.53(g)

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different.

3.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Remark
1	Portable Translator	HYP10	2ATSO-HYP10	EUT
2	Battery	F120001PA	DC 3.8V 2500mAh	AE
3	USB Cable	N/A	N/A	AE

***Note: All the accessories have been used during the test. The following “EUT” in setup diagram means EUT system.

4. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	2.1046/22.913(a)(2)/24.232(c)/ 27.50(d)(4)/ 27.50(h)(2)	Pass
		Radiated Output Power		
2	Peak-to-Average Ratio	Peak-to-Average Ratio	24.232(d)	Pass
3	Spurious Emission	Conducted Spurious Emission	2.1051/22.917(a)/24.238(a) 27.53(h)/ 27.53(g)	Pass
		Radiated Spurious Emission		
4	Frequency Stability		2.1055/22.355/24.235/27.54	Pass
5	Occupied Bandwidth		2.1049 (h)(i)	Pass
6	Band Edge		2.1051/22.917(a)/24.238(a) 27.53(h)/ 27.53(g)	Pass

5. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMW 500) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both LTE frequency band.

The worst condition was recorded in the test report if no other modes test data.

Test Mode	Test Modes Description
LTE	LTE system, QPSK modulation
LTE	LTE system, 16QAM modulation

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 2	TX (1.4M)	Channel 18607	Channel 18900	Channel 19193
		1850.7 MHz	1880 MHz	1909.3 MHz
	TX (3M)	Channel 18615	Channel 18900	Channel 19185
		1851.5 MHz	1880 MHz	1908.5 MHz
	TX (5M)	Channel 18625	Channel 18900	Channel 19175
		1852.5 MHz	1880 MHz	1907.5 MHz
	TX (10M)	Channel 18650	Channel 18900	Channel 19150
		1855.0 MHz	1880 MHz	1905.0 MHz
	TX (20M)	Channel 18700	Channel 18900	Channel 19100
		1860.0 MHz	1880 MHz	1900.0 MHz
	RX (1.4M)	Channel 607	Channel 900	Channel 1193
		1930.7 MHz	1960 MHz	1989.3 MHz
	RX (3M)	Channel 615	Channel 900	Channel 1185
		1931.5 MHz	1960 MHz	1988.5 MHz
	RX (5M)	Channel 625	Channel 900	Channel 1175
		1932.5 MHz	1960 MHz	1987.5 MHz
	RX (10M)	Channel 650	Channel 900	Channel 1150
		1935 MHz	1960 MHz	1985 MHz
	RX (20M)	Channel 700	Channel 900	Channel 1100
		1940.0 MHz	1960 MHz	1980 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 5	TX (1.4M)	Channel 20407	Channel 20525	Channel 20643
		824.7 MHz	836.5 MHz	848.3 MHz
	TX (3M)	Channel 20415	Channel 20525	Channel 20635
		825.5 MHz	836.5 MHz	847.5 MHz
	TX (5M)	Channel 20425	Channel 20525	Channel 20625
		826.5 MHz	836.5 MHz	846.5 MHz
	TX (10M)	Channel 20450	Channel 20525	Channel 20600
		829 MHz	836.5 MHz	844 MHz
	RX (1.4M)	Channel 2404	Channel 2525	Channel 2463
		869.4 MHz	881.5 MHz	893.3 MHz
	RX (3M)	Channel 2415	Channel 2525	Channel 2635
		870.5 MHz	881.5 MHz	892.5 MHz
	RX (5M)	Channel 2425	Channel 2525	Channel 2625
		871.5 MHz	881.5 MHz	891.5 MHz
	RX (10M)	Channel 2450	Channel 2525	Channel 2600
		874 MHz	881.5 MHz	889 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 7	TX (5M)	Channel 20775	Channel 21100	Channel 21425
		2502.5 MHz	2535 MHz	2567.5 MHz
	TX (10M)	Channel 20800	Channel 21100	Channel 21400
		2505.0 MHz	2535 MHz	2565 MHz
	TX (15M)	Channel 20825	Channel 21100	Channel 21275
		2507.5 MHz	2535 MHz	2562.5 MHz
	TX (20M)	Channel 20850	Channel 21100	Channel 21350
		2510.0 MHz	2535 MHz	2560 MHz
	RX (5M)	Channel 2775	Channel 3100	Channel 3425
		2622.5 MHz	2655 MHz	2687.5 MHz
	RX (10M)	Channel 2800	Channel 3100	Channel 3400
		2625.0 MHz	2655 MHz	2685 MHz
	RX (15M)	Channel 2825	Channel 3100	Channel 3375
		2627.5 MHz	2655 MHz	2682.5 MHz
	RX (20M)	Channel 2850	Channel 3100	Channel 3350
		2630.0 MHz	2655 MHz	2680.0 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 12	TX (1.4M)	Channel 23017	Channel 23095	Channel 23173
		699.7 MHz	707.5 MHz	715.3 MHz
	TX (3M)	Channel 23025	Channel 23095	Channel 23165
		700.5 MHz	707.5 MHz	714.5 MHz
	TX (5M)	Channel 23035	Channel 23095	Channel 23155
		701.5 MHz	707.5 MHz	713.5 MHz
	TX (10M)	Channel 23060	Channel 23095	Channel 23130
		704.0 MHz	707.5 MHz	711.0 MHz
	RX (1.4M)	Channel 5017	Channel 5095	Channel 5173
		729.7 MHz	737.5 MHz	745.3 MHz
	RX (3M)	Channel 5025	Channel 5095	Channel 5165
		730.5 MHz	737.5 MHz	744.5 MHz
	RX (5M)	Channel 5035	Channel 5095	Channel 5155
		731.5 MHz	737.5 MHz	743.5 MHz
	RX (10M)	Channel 5060	Channel 5095	Channel 5130
		734.0 MHz	737.5 MHz	741.0 MHz

LTE Band 17	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
	TX (5M)	Channel 23755	Channel 23790	Channel 23825
		706.5 MHz	710 MHz	713.5 MHz
	TX (10M)	Channel 23780	Channel 23790	Channel 23800
		709.0 MHz	710 MHz	711.0 MHz
	RX (5M)	Channel 5755	Channel 5790	Channel 5825
		736.5 MHz	740 MHz	743.5 MHz
	RX (10M)	Channel 5780	Channel 5790	Channel 5800
		739.0 MHz	740 MHz	741.0 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 40	TX (5M)	Channel 38675	Channel 39150	Channel 39625
		2302.5 MHz	2350.0 MHz	2397.5 MHz
	TX (10M)	Channel 38700	Channel 39150	Channel 39600
		2305.0 MHz	2350.0 MHz	2395.0 MHz
	TX (15M)	Channel 38725	Channel 39150	Channel 39575
		2307.5 MHz	2350.0 MHz	2392.5 MHz
	TX (20M)	Channel 38750	Channel 39150	Channel 39550
		2310.0 MHz	2350.0 MHz	2390.0 MHz
	RX (5M)	Channel 38675	Channel 39150	Channel 39625
		2302.5 MHz	2350.0 MHz	2397.5 MHz
	RX (10M)	Channel 38700	Channel 39150	Channel 39600
		2305.0 MHz	2350.0 MHz	2395.0 MHz
	RX (15M)	Channel 38725	Channel 39150	Channel 39575
		2307.5 MHz	2350.0 MHz	2392.5 MHz
	RX (20M)	Channel 38750	Channel 39150	Channel 39550
		2310.0 MHz	2350.0 MHz	2390.0 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 41	TX (5M)	Channel 40065	Channel 40620	Channel 41216
		2537.5 MHz	2593.0 MHz	2652.6 MHz
	TX (10M)	Channel 40090	Channel 40620	Channel 41191
		2540.0 MHz	2593.0 MHz	2650.1 MHz
	TX (15M)	Channel 40115	Channel 40620	Channel 41166
		2542.5 MHz	2593.0 MHz	2647.6 MHz
	TX (20M)	Channel 40140	Channel 40620	Channel 41141
		2545.0 MHz	2593.0 MHz	2645.1 MHz
	RX (5M)	Channel 40065	Channel 40620	Channel 41216
		2537.5 MHz	2593.0 MHz	2652.6 MHz
	RX (10M)	Channel 40090	Channel 40620	Channel 41191
		2540.0 MHz	2593.0 MHz	2650.1 MHz
	RX (15M)	Channel 40115	Channel 40620	Channel 41166
		2542.5 MHz	2593.0 MHz	2647.6 MHz
	RX (20M)	Channel 40140	Channel 40620	Channel 41141
		2545.0 MHz	2593.0 MHz	2645.1 MHz

6. OUTPUT POWER

6.1 CONDUCTED OUTPUT POWER

6.1.1 MEASUREMENT METHOD

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50ohm, the path loss as the factor is calibrated to correct the reading. A system simulator was used to establish communication with the EUT , Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported. The measurements were performed on all modes at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

6.1.2 MEASUREMENT RESULT

Conducted Output Power Limits		
Mode	**Average Power**	**Tolerance(dB)**
LTE	23 dBm (0.2W)	± 2.7

LTE Band 2

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	18700	1860.0	QPSK	1	0	0	23.29
				1	49	0	23.56
				1	99	0	23.17
				50	0	1	22.42
				50	25	1	22.42
				50	49	1	22.38
				100	0	1	22.38
			16QAM	1	0	1	22.31
				1	49	1	22.60
				1	99	1	22.15
				50	0	2	22.41
				50	25	2	22.39
				50	49	2	22.37
				100	0	2	21.35
	18900	1880.0	QPSK	1	0	0	23.10
				1	49	0	23.28
				1	99	0	22.80
				50	0	1	22.22
				50	25	1	22.23
				50	49	1	22.10
				100	0	1	22.18
			16QAM	1	0	1	22.22
				1	49	1	22.43
				1	99	1	21.98
				50	0	2	22.22
				50	25	2	22.20
				50	49	2	22.10
				100	0	2	21.15
	19100	1900.0	QPSK	1	0	0	22.75
				1	49	0	23.39
				1	99	0	23.01
				50	0	1	22.35
				50	25	1	22.30
				50	49	1	22.34
				100	0	1	22.34
			16QAM	1	0	1	21.86
				1	49	1	22.51
				1	99	1	22.09
				50	0	2	22.36
				50	25	2	22.32
				50	49	2	22.35
				100	0	2	21.35

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	18675	1857.5	QPSK	1	0	0	23.36
				1	38	0	23.40
				1	74	0	23.30
				38	0	1	22.49
				38	18	1	22.47
				38	37	1	22.50
				75	0	1	22.50
			16QAM	1	0	1	22.56
				1	38	1	22.59
				1	74	1	22.50
				38	0	2	22.53
				38	18	2	22.48
				38	37	2	22.49
				75	0	2	21.43
	18900	1880.0	QPSK	1	0	0	23.14
				1	38	0	23.14
				1	74	0	22.92
				38	0	1	22.19
				38	18	1	22.18
				38	37	1	22.21
				75	0	1	22.21
			16QAM	1	0	1	22.41
				1	38	1	22.41
				1	74	1	22.21
				38	0	2	22.23
				38	18	2	22.21
				38	37	2	22.19
				75	0	2	21.18
	19125	1902.5	QPSK	1	0	0	23.18
				1	38	0	23.49
				1	74	0	23.28
				38	0	1	22.52
				38	18	1	22.49
				38	37	1	22.53
				75	0	1	22.53
			16QAM	1	0	1	22.06
				1	38	1	22.37
				1	74	1	22.16
				38	0	2	22.54
				38	18	2	22.52
				38	37	2	22.51
				75	0	2	21.47

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	18650	1855.0	QPSK	1	0	0	23.40
				1	24	0	23.54
				1	49	0	23.36
				25	0	1	22.44
				25	12	1	22.47
				25	25	1	22.50
				50	0	1	22.51
			16QAM	1	0	1	22.61
				1	24	1	22.73
				1	49	1	22.53
				25	0	2	22.49
				25	12	2	22.48
				25	25	2	22.52
				50	0	2	21.49
	18900	1880.0	QPSK	1	0	0	23.19
				1	24	0	23.21
				1	49	0	23.03
				25	0	1	22.22
				25	12	1	22.22
				25	25	1	22.18
				50	0	1	22.18
			16QAM	1	0	1	22.32
				1	24	1	22.41
				1	49	1	22.18
				25	0	2	22.23
				25	12	2	22.22
				25	25	2	22.20
				50	0	2	21.21
	19150	1905.0	QPSK	1	0	0	23.44
				1	24	0	23.57
				1	49	0	23.34
				25	0	1	22.59
				25	12	1	22.59
				25	25	1	22.47
				50	0	1	22.55
			16QAM	1	0	1	22.33
				1	24	1	22.46
				1	49	1	22.19
				25	0	2	22.60
				25	12	2	22.59
				25	25	2	22.46
				50	0	2	21.56

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	18625	1852.5	QPSK	1	0	0	23.45
				1	12	0	23.54
				1	24	0	23.38
				12	0	1	22.44
				12	6	1	22.43
				12	13	1	22.44
				25	0	1	22.51
			16QAM	1	0	1	22.46
				1	12	1	22.55
				1	24	1	22.46
				12	0	2	22.40
				12	6	2	22.41
				12	13	2	22.48
				25	0	2	21.50
	18900	1880.0	QPSK	1	0	0	23.14
				1	12	0	23.24
				1	24	0	23.08
				12	0	1	22.15
				12	6	1	22.15
				12	13	1	22.13
				25	0	1	22.17
			16QAM	1	0	1	22.32
				1	12	1	22.41
				1	24	1	22.24
				12	0	2	22.11
				12	6	2	22.15
				12	13	2	22.06
				25	0	2	21.13
	19175	1907.5	QPSK	1	0	0	23.40
				1	12	0	23.49
				1	24	0	23.31
				12	0	1	22.40
				12	6	1	22.41
				12	13	1	22.34
				25	0	1	22.43
			16QAM	1	0	1	22.41
				1	12	1	22.52
				1	24	1	22.31
				12	0	2	22.40
				12	6	2	22.42
				12	13	2	22.30
				25	0	2	21.45

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	18615	1851.5	QPSK	1	0	0	23.45
				1	8	0	23.41
				1	14	0	23.51
				8	0	1	22.46
				8	4	1	22.47
				8	8	1	22.48
				15	0	1	22.47
			16QAM	1	0	1	22.64
				1	8	1	22.61
				1	14	1	22.64
				8	0	2	22.48
				8	4	2	22.47
				8	8	2	22.49
				15	0	2	21.48
	18900	1880.0	QPSK	1	0	0	23.18
				1	8	0	23.15
				1	14	0	23.10
				8	0	1	22.08
				8	4	1	22.11
				8	7	1	22.12
				15	0	1	22.13
			16QAM	1	0	1	22.34
				1	8	1	22.28
				1	14	1	22.28
				8	0	2	22.08
				8	4	2	22.08
				8	8	2	22.11
				15	0	2	21.07
	19185	1908.5	QPSK	1	0	0	23.35
				1	8	0	23.37
				1	14	0	23.30
				8	0	1	22.35
				8	4	1	22.34
				8	8	1	22.31
				15	0	1	22.35
			16QAM	1	0	1	22.28
				1	8	1	22.24
				1	14	1	22.23
				8	0	2	22.37
				8	4	2	22.34
				8	8	2	22.33
				15	0	2	21.30

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	M PR	Average power (dBm)
1.4MHz	18607	1850.7	QPSK	1	0	0	23.92
				1	2	0	24.03
				1	5	0	23.56
				3	0	0	23.50
				3	1	0	23.52
				3	2	0	23.52
				6	0	1	22.46
			16QAM	1	0	1	22.54
				1	2	1	22.72
				1	5	1	22.53
				3	0	1	23.51
				3	1	1	23.51
				3	2	1	23.50
				6	0	2	21.50
	18900	1880.0	QPSK	1	0	0	23.09
				1	2	0	23.19
				1	5	0	23.08
				3	0	0	23.19
				3	1	0	23.17
				3	2	0	23.22
				6	0	1	22.11
			16QAM	1	0	1	22.26
				1	2	1	22.42
				1	5	1	22.25
				3	0	1	23.18
				3	1	1	23.19
				3	2	1	23.21
				6	0	2	21.01
	19193	1909.3	QPSK	1	0	0	23.31
				1	2	0	23.45
				1	5	0	23.26
				3	0	0	23.37
				3	1	0	23.39
				3	2	0	23.40
				6	0	1	22.33
			16QAM	1	0	1	22.21
				1	2	1	22.35
				1	5	1	22.16
				3	0	1	23.40
				3	1	1	23.38
				3	2	1	23.40
				6	0	2	21.34

LTE Band 5

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	20450	829	QPSK	1	0	0	23.58
				1	24	0	23.55
				1	49	0	23.46
				25	0	1	22.51
				25	12	1	22.50
				25	25	1	22.42
				50	0	1	22.45
			16QAM	1	0	1	22.75
				1	24	1	22.66
				1	49	1	22.59
				25	0	2	22.50
				25	12	2	22.49
				25	25	2	22.45
				50	0	2	21.41
	20525	836.5	QPSK	1	0	0	23.40
				1	24	0	23.73
				1	49	0	23.70
				25	0	1	22.63
				25	12	1	22.65
				25	25	1	22.74
				50	0	1	22.71
			16QAM	1	0	1	22.59
				1	24	1	22.97
				1	49	1	22.94
				25	0	2	22.68
				25	12	2	22.65
				25	25	2	22.71
				50	0	2	21.69
	20600	844	QPSK	1	0	0	24.25
				1	24	0	24.47
				1	49	0	24.29
				25	0	1	23.46
				25	12	1	23.46
				25	25	1	23.37
				50	0	1	23.44
			16QAM	1	0	1	23.56
				1	24	1	23.67
				1	49	1	23.56
				25	0	2	23.46
				25	12	2	23.49
				25	25	2	23.38
				50	0	2	22.43

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	20425	826.5	QPSK	1	0	0	23.45
				1	12	0	23.17
				1	24	0	22.86
				12	0	1	22.20
				12	6	1	22.22
				12	11	1	22.02
				25	0	1	22.16
			16QAM	1	0	1	22.47
				1	12	1	22.16
				1	24	1	21.88
				12	0	2	22.18
				12	6	2	22.21
				12	11	2	22.02
				25	0	2	21.13
	20525	836.5	QPSK	1	0	0	22.85
				1	12	0	22.99
				1	24	0	22.87
				12	0	1	21.91
				12	6	1	21.94
				12	11	1	21.98
				25	0	1	22.01
			16QAM	1	0	1	22.02
				1	12	1	22.27
				1	24	1	22.16
				12	0	2	21.91
				12	6	2	21.92
				12	11	2	21.98
				25	0	2	20.97
	20625	846.5	QPSK	1	0	0	23.26
				1	12	0	23.18
				1	24	0	22.96
				12	0	1	22.28
				12	6	1	22.28
				12	11	1	23.24
				25	0	1	23.35
			16QAM	1	0	1	22.32
				1	12	1	22.32
				1	24	1	22.06
				12	0	2	23.38
				12	6	2	23.37
				12	11	2	23.23
				25	0	2	22.37

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	20415	825.5	QPSK	1	0	0	23.54
				1	7	0	23.26
				1	14	0	23.12
				8	0	1	22.25
				8	4	1	22.26
				8	7	1	22.28
				15	0	1	22.30
			16QAM	1	0	1	22.67
				1	7	1	22.42
				1	14	1	22.23
				8	0	2	22.30
				8	4	2	22.30
				8	7	2	22.29
				15	0	2	21.29
	20525	836.5	QPSK	1	0	0	22.94
				1	7	0	22.95
				1	14	0	22.93
				8	0	1	21.97
				8	4	1	21.96
				8	7	1	21.99
				15	0	1	21.97
			16QAM	1	0	1	22.13
				1	7	1	22.18
				1	14	1	22.17
				8	0	2	21.94
				8	4	2	21.97
				8	7	2	21.98
				15	0	2	20.86
	20635	847.5	QPSK	1	0	0	23.08
				1	7	0	23.02
				1	14	0	22.97
				8	0	1	22.12
				8	4	1	22.13
				8	7	1	22.16
				15	0	1	22.15
			16QAM	1	0	1	22.38
				1	7	1	22.30
				1	14	1	22.23
				8	0	2	22.12
				8	4	2	22.10
				8	7	2	22.09
				15	0	2	21.15

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
1.4MHz	20407	824.7	QPSK	1	0	0	23.44
				1	2	0	23.41
				1	5	0	23.26
				3	0	0	23.46
				3	1	0	23.45
				3	2	0	23.38
				6	0	1	22.38
			16QAM	1	0	1	22.50
				1	2	1	22.62
				1	5	1	22.38
				3	0	1	23.42
				3	1	1	23.44
				3	2	1	23.36
				6	0	2	21.37
	20525	836.5	QPSK	1	0	0	22.87
				1	2	0	23.00
				1	5	0	22.87
				3	0	0	22.83
				3	1	0	22.87
				3	2	0	22.92
				6	0	1	21.93
			16QAM	1	0	1	22.03
				1	2	1	22.21
				1	5	1	22.05
				3	0	1	22.87
				3	1	1	22.84
				3	2	1	22.92
				6	0	2	20.88
	20643	848.3	QPSK	1	0	0	22.93
				1	2	0	23.05
				1	5	0	22.89
				3	0	0	23.01
				3	1	0	23.01
				3	2	0	23.01
				6	0	1	22.08
			16QAM	1	0	1	22.14
				1	2	1	22.34
				1	5	1	22.13
				3	0	1	23.02
				3	1	1	23.02
				3	2	1	23.01
				6	0	2	21.13

LTE Band 7

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	20850	2510	QPSK	1	0	0	23.02
				1	49	0	23.59
				1	99	0	22.97
				50	0	1	22.24
				50	25	1	22.23
				50	49	1	22.37
				100	0	1	22.29
			16QAM	1	0	1	21.97
				1	49	1	22.55
				1	99	1	21.97
				50	0	2	22.23
				50	25	2	22.21
				50	49	2	22.39
				100	0	2	21.30
	21100	2535	QPSK	1	0	0	22.78
				1	49	0	23.03
				1	99	0	22.81
				50	0	1	21.96
				50	25	1	21.99
				50	49	1	21.91
				100	0	1	21.92
			16QAM	1	0	1	21.88
				1	49	1	22.15
				1	99	1	21.92
				50	0	2	21.98
				50	25	2	21.98
				50	49	2	21.92
				100	0	2	21.00
	21350	2560	QPSK	1	0	0	22.82
				1	49	0	23.43
				1	99	0	22.98
				50	0	1	22.24
				50	25	1	22.22
				50	49	1	22.29
				100	0	1	22.24
			16QAM	1	0	1	21.88
				1	49	1	22.40
				1	99	1	22.06
				50	0	2	22.22
				50	25	2	22.21
				50	49	2	22.25
				100	0	2	21.20

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	20825	2507.5	QPSK	1	0	0	23.10
				1	37	0	23.47
				1	74	0	23.24
				36	0	1	22.45
				36	16	1	22.44
				36	35	1	22.43
				75	0	1	22.48
			16QAM	1	0	1	22.21
				1	37	1	22.54
				1	74	1	22.35
				36	0	2	22.44
				36	16	2	22.44
				36	35	2	22.42
				75	0	2	21.43
	21100	2535	QPSK	1	0	0	22.90
				1	37	0	22.88
				1	74	0	22.87
				36	0	1	22.00
				36	16	1	22.03
				36	35	1	22.03
				75	0	1	22.00
			16QAM	1	0	1	22.08
				1	37	1	22.13
				1	74	1	22.10
				36	0	2	22.02
				36	16	2	22.01
				36	35	2	21.99
				75	0	2	23.22
	21375	2562.5	QPSK	1	0	0	23.42
				1	37	0	23.26
				1	74	0	22.42
				36	0	1	22.40
				36	16	1	22.43
				36	35	1	22.43
				75	0	1	23.22
			16QAM	1	0	1	22.06
				1	37	1	22.33
				1	74	1	22.09
				36	0	2	22.43
				36	16	2	22.41
				36	35	2	22.43
				75	0	2	21.34

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	20800	2505	QPSK	1	0	0	23.19
				1	24	0	23.44
				1	49	0	23.47
				25	0	1	22.26
				25	12	1	22.26
				25	25	1	22.49
				50	0	1	22.37
			16QAM	1	0	1	22.35
				1	24	1	22.62
				1	49	1	22.60
				25	0	2	22.24
				25	12	2	22.26
				25	25	2	22.48
				50	0	2	21.39
	21100	2535	QPSK	1	0	0	22.93
				1	24	0	23.00
				1	49	0	22.91
				25	0	1	21.91
				25	12	1	21.96
				25	25	1	21.93
				50	0	1	21.94
			16QAM	1	0	1	22.03
				1	24	1	22.10
				1	49	1	22.01
				25	0	2	21.93
				25	12	2	21.94
				25	25	2	21.94
				50	0	2	21.00
	21400	2565	QPSK	1	0	0	23.56
				1	24	0	23.51
				1	49	0	23.34
				25	0	1	22.50
				25	12	1	22.48
				25	25	1	22.30
				50	0	1	22.38
			16QAM	1	0	1	22.33
				1	24	1	22.36
				1	49	1	22.21
				25	0	2	22.47
				25	12	2	22.48
				25	25	2	22.32
				50	0	2	21.30

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	20775	2502.5	QPSK	1	0	0	23.19
				1	12	0	23.42
				1	24	0	23.34
				12	0	1	22.13
				12	6	1	22.18
				12	13	1	22.32
				25	0	1	22.30
			16QAM	1	0	1	22.09
				1	12	1	22.22
				1	24	1	22.28
				12	0	2	22.15
				12	6	2	22.14
				12	13	2	22.30
				25	0	2	21.30
	21100	2535	QPSK	1	0	0	22.89
				1	12	0	23.03
				1	24	0	22.87
				12	0	1	21.86
				12	6	1	21.86
				12	13	1	21.87
				25	0	1	21.87
			16QAM	1	0	1	22.03
				1	12	1	22.13
				1	24	1	22.00
				12	0	2	21.89
				12	6	2	21.87
				12	13	2	21.87
				25	0	2	20.92
	21425	2567.5	QPSK	1	0	0	23.43
				1	12	0	23.48
				1	24	0	23.32
				12	0	1	22.40
				12	6	1	22.41
				12	13	1	22.26
				25	0	1	22.30
			16QAM	1	0	1	22.34
				1	12	1	22.44
				1	24	1	22.26
				12	0	2	22.35
				12	6	2	22.36
				12	13	2	22.24
				25	0	2	21.34

LTE Band 12

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	23060	704.0	QPSK	1	0	0	24.15
				1	24	0	24.43
				1	49	0	24.36
				25	0	1	23.41
				25	12	1	23.41
				25	25	1	23.50
				50	0	1	23.42
			16QAM	1	0	1	23.23
				1	24	1	23.53
				1	49	1	23.47
				25	0	2	23.40
				25	12	2	23.41
				25	25	2	23.50
				50	0	2	22.36
	23095	707.5	QPSK	1	0	0	24.31
				1	24	0	24.48
				1	49	0	24.18
				25	0	1	23.34
				25	12	1	23.33
				25	25	1	23.32
				50	0	1	23.36
			16QAM	1	0	1	23.40
				1	24	1	23.53
				1	49	1	23.29
				25	0	2	23.34
				25	12	2	23.34
				25	25	2	23.31
				50	0	2	22.31
	23130	711.0	QPSK	1	0	0	24.36
				1	24	0	24.36
				1	49	0	23.99
				25	0	1	23.39
				25	12	1	23.39
				25	25	1	23.12
				50	0	1	23.20
			16QAM	1	0	1	23.23
				1	24	1	23.17
				1	49	1	22.81
				25	0	2	23.40
				25	12	2	23.38
				25	25	2	23.14
				50	0	2	22.19

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	23035	701.5	QPSK	1	0	0	24.22
				1	12	0	24.35
				1	24	0	24.32
				12	0	1	23.26
				12	6	1	23.22
				12	13	1	23.29
				25	0	1	23.27
			16QAM	1	0	1	23.11
				1	12	1	23.29
				1	24	1	23.29
				12	0	2	23.22
				12	6	2	23.23
				12	13	2	23.29
				25	0	2	22.27
	23095	707.5	QPSK	1	0	0	24.34
				1	12	0	24.47
				1	24	0	24.32
				12	0	1	23.30
				12	6	1	23.30
				12	13	1	23.37
				25	0	1	23.40
			16QAM	1	0	1	23.46
				1	12	1	23.57
				1	24	1	23.43
				12	0	2	23.35
				12	6	2	23.31
				12	13	2	23.35
				25	0	2	22.33
	23155	713.5	QPSK	1	0	0	24.22
				1	12	0	24.19
				1	24	0	24.01
				12	0	1	23.21
				12	6	1	23.23
				12	13	1	23.02
				25	0	1	23.14
			16QAM	1	0	1	23.16
				1	12	1	23.12
				1	24	1	22.82
				12	0	2	23.25
				12	6	2	23.21
				12	13	2	23.03
				25	0	2	22.12

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	23025	700.5	QPSK	1	0	0	24.19
				1	7	0	24.21
				1	14	0	24.26
				8	0	1	23.18
				8	4	1	23.19
				8	7	1	23.19
				15	0	1	23.21
			16QAM	1	0	1	23.30
				1	7	1	23.31
				1	14	1	23.38
				8	0	2	23.19
				8	4	2	23.20
				8	7	2	23.21
				15	0	2	22.19
	23095	707.5	QPSK	1	0	0	24.40
				1	7	0	24.40
				1	14	0	24.34
				8	0	1	23.36
				8	4	1	23.33
				8	7	1	23.39
				15	0	1	23.38
			16QAM	1	0	1	23.48
				1	7	1	23.45
				1	14	1	23.42
				8	0	2	23.38
				8	4	2	23.37
				8	7	2	23.36
				15	0	2	22.27
	23165	714.5	QPSK	1	0	0	24.16
				1	7	0	24.02
				1	14	0	23.98
				8	0	1	23.00
				8	4	1	23.01
				8	7	1	23.01
				15	0	1	23.01
			16QAM	1	0	1	22.98
				1	7	1	22.85
				1	14	1	22.79
				8	0	2	23.01
				8	4	2	23.00
				8	7	2	23.00
				15	0	2	21.89

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
1.4MHz	23017	699.7	QPSK	1	0	0	24.26
				1	2	0	24.33
				1	5	0	24.19
				3	0	0	24.20
				3	1	0	24.23
				3	2	0	24.22
				6	0	1	23.25
			16QAM	1	0	1	23.19
				1	2	1	23.27
				1	5	1	23.16
				3	0	1	24.21
				3	1	1	24.20
				3	2	1	24.22
				6	0	2	22.20
	23095	707.5	QPSK	1	0	0	24.38
				1	2	0	24.39
				1	5	0	24.37
				3	0	0	24.39
				3	1	0	24.40
				3	2	0	24.42
				6	0	1	23.45
			16QAM	1	0	1	23.35
				1	2	1	23.55
				1	5	1	23.37
				3	0	1	24.38
				3	1	1	24.38
				3	2	1	24.43
				6	0	2	22.25
	23173	715.3	QPSK	1	0	0	23.93
				1	2	0	24.08
				1	5	0	23.94
				3	0	0	23.93
				3	1	0	23.93
				3	2	0	23.89
				6	0	1	23.06
			16QAM	1	0	1	22.78
				1	2	1	22.87
				1	5	1	22.72
				3	0	1	23.91
				3	1	1	23.92
				3	2	1	23.89
				6	0	2	21.93

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BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	23780	709.0	QPSK	1	0	0	23.46
				1	24	0	23.54
				1	49	0	23.22
				25	0	1	22.52
				25	12	1	22.51
				25	25	1	22.32
				50	0	1	22.42
			16QAM	1	0	1	22.63
				1	24	1	22.64
				1	49	1	22.36
				25	0	2	22.48
				25	12	2	22.51
				25	25	2	22.32
				50	0	2	21.43
	23790	710	QPSK	1	0	0	23.45
				1	24	0	23.55
				1	49	0	23.10
				25	0	1	22.53
				25	12	1	22.54
				25	25	1	22.29
				50	0	1	22.48
			16QAM	1	0	1	22.59
				1	24	1	22.58
				1	49	1	22.18
				25	0	2	22.49
				25	12	2	22.53
				25	25	2	22.41
				50	0	2	21.46
	23800	711.0	QPSK	1	0	0	23.53
				1	24	0	23.51
				1	49	0	23.05
				25	0	1	22.56
				25	12	1	22.58
				25	25	1	22.26
				50	0	1	22.41
			16QAM	1	0	1	22.36
				1	24	1	22.33
				1	49	1	21.95
				25	0	2	22.50
				25	12	2	22.55
				25	25	2	22.28
				50	0	2	21.45

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	23755	706.5	QPSK	1	0	0	23.47
				1	12	0	23.60
				1	24	0	23.48
				12	0	1	22.48
				12	6	1	22.47
				12	13	1	22.59
				25	0	1	22.52
			16QAM	1	0	1	22.59
				1	12	1	22.77
				1	24	1	22.64
				12	0	2	22.45
				12	6	2	22.56
				12	13	2	22.62
				25	0	2	21.54
	23095	710.0	QPSK	1	0	0	23.54
				1	12	0	23.55
				1	24	0	23.33
				12	0	1	22.52
				12	6	1	22.52
				12	13	1	22.52
				25	0	1	22.49
			16QAM	1	0	1	22.54
				1	12	1	22.43
				1	24	1	22.34
				12	0	2	22.46
				12	6	2	22.56
				12	13	2	22.44
				25	0	2	21.58
	23825	712.6	QPSK	1	0	0	23.32
				1	12	0	23.26
				1	24	0	23.02
				12	0	1	22.33
				12	6	1	22.35
				12	13	1	22.13
				25	0	1	22.25
			16QAM	1	0	1	22.34
				1	12	1	22.19
				1	24	1	21.91
				12	0	2	22.38
				12	6	2	22.34
				12	13	2	22.15
				25	0	2	21.24

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BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	38750	2310.0	QPSK	1	0	0	22.94
				1	49	0	22.84
				1	99	0	21.81
				50	0	1	21.86
				50	25	1	21.85
				50	49	1	21.40
				100	0	1	21.59
			16QAM	1	0	1	21.96
				1	49	1	21.85
				1	99	1	20.84
				50	0	2	20.94
				50	25	2	20.97
				50	49	2	20.48
				100	0	2	20.64
	39150	2350.0	QPSK	1	0	0	21.89
				1	49	0	22.42
				1	99	0	22.24
				50	0	1	21.12
				50	25	1	21.15
				50	49	1	21.14
				100	0	1	21.13
			16QAM	1	0	1	21.05
				1	49	1	21.57
				1	99	1	21.42
				50	0	2	20.24
				50	25	2	20.27
				50	49	2	20.28
				100	0	2	20.23
	39550	2390.0	QPSK	1	0	0	23.30
				1	49	0	23.78
				1	99	0	23.11
				50	0	1	22.54
				50	25	1	22.52
				50	49	1	22.42
				100	0	1	22.48
			16QAM	1	0	1	22.24
				1	49	1	22.69
				1	99	1	21.99
				50	0	2	21.52
				50	25	2	21.51
				50	49	2	21.42
				100	0	2	21.43

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	38725	2307.5	QPSK	1	0	0	23.15
				1	37	0	22.78
				1	74	0	22.23
				36	0	1	21.83
				36	16	1	21.83
				36	35	1	21.83
				75	0	1	21.83
			16QAM	1	0	1	22.27
				1	37	1	21.96
				1	74	1	21.40
				36	0	2	21.84
				36	16	2	21.83
				36	35	2	21.84
				75	0	2	20.84
	39150	2350.0	QPSK	1	0	0	22.09
				1	37	0	22.19
				1	74	0	22.14
				36	0	1	21.17
				36	16	1	21.17
				36	35	1	21.18
				75	0	1	21.18
			16QAM	1	0	1	21.24
				1	37	1	21.30
				1	74	1	21.28
				36	0	2	21.18
				36	16	2	21.17
				36	35	2	21.18
				75	0	2	20.23
	39575	2392.5	QPSK	1	0	0	23.38
				1	37	0	23.44
				1	74	0	23.19
				36	0	1	22.44
				36	16	1	22.45
				36	35	1	22.44
				75	0	1	22.45
			16QAM	1	0	1	22.28
				1	37	1	22.29
				1	74	1	21.97
				36	0	2	22.44
				36	16	2	22.44
				36	35	2	22.44
				75	0	2	21.37

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	38700	2305.0	QPSK	1	0	0	23.23
				1	24	0	23.19
				1	49	0	22.59
				25	0	1	22.00
				25	12	1	22.02
				25	25	1	21.82
				50	0	1	21.93
			16QAM	1	0	1	22.41
				1	24	1	22.35
				1	49	1	21.77
				25	0	2	22.03
				25	12	2	22.01
				25	25	2	21.79
				50	0	2	20.99
	39150	2350.0	QPSK	1	0	0	22.30
				1	24	0	22.39
				1	49	0	22.00
				25	0	1	21.11
				25	12	1	21.11
				25	25	1	21.06
				50	0	1	21.12
			16QAM	1	0	1	21.35
				1	24	1	21.44
				1	49	1	21.20
				25	0	2	21.10
				25	12	2	21.10
				25	25	2	21.08
				50	0	2	20.20
	39600	2395.0	QPSK	1	0	0	23.52
				1	24	0	23.73
				1	49	0	23.35
				25	0	1	22.45
				25	12	1	22.45
				25	25	1	22.36
				50	0	1	22.44
			16QAM	1	0	1	22.41
				1	24	1	22.55
				1	49	1	22.19
				25	0	2	22.44
				25	12	2	22.48
				25	25	2	22.38
				50	0	2	21.38

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	38675	2302.5	QPSK	1	0	0	23.14
				1	12	0	23.13
				1	24	0	22.85
				12	0	1	22.09
				12	6	1	22.06
				12	11	1	22.06
				25	0	1	22.07
			16QAM	1	0	1	22.12
				1	12	1	22.10
				1	24	1	21.86
				12	0	2	22.08
				12	6	2	22.08
				12	11	2	22.04
				25	0	2	21.17
	39150	2350.0	QPSK	1	0	0	22.14
				1	12	0	22.21
				1	24	0	22.08
				12	0	1	21.13
				12	6	1	21.14
				12	11	1	21.14
				25	0	1	21.13
			16QAM	1	0	1	21.32
				1	12	1	21.39
				1	24	1	21.25
				12	0	2	21.13
				12	6	2	21.16
				12	11	2	21.17
				25	0	2	20.23
	39625	2397.5	QPSK	1	0	0	23.37
				1	12	0	23.46
				1	24	0	23.30
				12	0	1	22.30
				12	6	1	22.30
				12	11	1	22.31
				25	0	1	22.29
			16QAM	1	0	1	22.32
				1	12	1	22.37
				1	24	1	22.18
				12	0	2	22.33
				12	6	2	22.33
				12	11	2	22.31
				25	0	2	20.98

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BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	39750	2545.0	QPSK	1	0	0	22.89
				1	49	0	22.68
				1	99	0	22.59
				50	0	1	21.28
				50	25	1	21.28
				50	49	1	21.60
				100	0	1	21.43
			16QAM	1	0	1	20.98
				1	49	1	21.67
				1	99	1	21.59
				50	0	2	20.27
				50	25	2	20.28
				50	49	2	20.61
				100	0	2	20.44
	40620	2593.0	QPSK	1	0	0	23.83
				1	49	0	23.59
				1	99	0	23.67
				50	0	1	23.13
				50	25	1	23.12
				50	49	1	23.06
				100	0	1	23.07
			16QAM	1	0	1	23.02
				1	49	1	23.75
				1	99	1	22.82
				50	0	2	22.04
				50	25	2	22.01
				50	49	2	22.09
				100	0	2	22.09
	41490	2645.1	QPSK	1	0	0	23.58
				1	49	0	23.21
				1	99	0	23.19
				50	0	1	21.91
				50	25	1	21.87
				50	49	1	22.09
				100	0	1	21.97
			16QAM	1	0	1	21.53
				1	49	1	22.06
				1	99	1	22.11
				50	0	2	20.87
				50	25	2	20.91
				50	49	2	21.14
				100	0	2	20.95

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	40115	2542.5	QPSK	1	0	0	22.19
				1	37	0	22.36
				1	74	0	22.54
				36	0	1	21.36
				36	16	1	21.39
				36	35	1	21.40
				75	0	1	21.38
			16QAM	1	0	1	21.28
				1	37	1	21.50
				1	74	1	21.65
				36	0	2	21.39
				36	16	2	21.39
				36	35	2	21.40
				75	0	2	20.33
	40620	2593.0	QPSK	1	0	0	23.10
				1	37	0	23.36
				1	74	0	23.90
				36	0	1	23.21
				36	16	1	23.22
				36	35	1	23.20
				75	0	1	23.21
			16QAM	1	0	1	23.25
				1	37	1	23.51
				1	74	1	23.11
				36	0	2	23.21
				36	16	2	23.21
				36	35	2	23.22
				75	0	2	22.18
	41166	2647.6	QPSK	1	0	0	22.07
				1	37	0	22.39
				1	74	0	22.67
				36	0	1	21.60
				36	16	1	21.59
				36	35	1	21.57
				75	0	1	21.59
			16QAM	1	0	1	21.19
				1	37	1	21.50
				1	74	1	21.74
				36	0	2	21.59
				36	16	2	21.59
				36	35	2	21.59
				75	0	2	20.41

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	40090	2540.0	QPSK	1	0	0	22.21
				1	24	0	22.59
				1	49	0	22.40
				25	0	1	21.22
				25	12	1	21.22
				25	25	1	21.34
				50	0	1	21.28
			16QAM	1	0	1	21.35
				1	24	1	21.67
				1	49	1	21.55
				25	0	2	21.24
				25	12	2	21.23
				25	25	2	21.37
				50	0	2	20.31
	40620	2593.0	QPSK	1	0	0	23.24
				1	24	0	23.61
				1	49	0	23.18
				25	0	1	23.26
				25	12	1	23.27
				25	25	1	23.23
				50	0	1	23.28
			16QAM	1	0	1	23.30
				1	24	1	23.66
				1	49	1	23.22
				25	0	2	23.26
				25	12	2	23.25
				25	25	2	23.24
				50	0	2	22.26
	41191	2650.1	QPSK	1	0	0	22.24
				1	24	0	22.74
				1	49	0	22.77
				25	0	1	21.44
				25	12	1	21.45
				25	25	1	21.64
				50	0	1	21.54
			16QAM	1	0	1	21.36
				1	24	1	21.82
				1	49	1	21.85
				25	0	2	21.46
				25	12	2	21.47
				25	25	2	21.65
				50	0	2	20.51

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	40065	2537.5	QPSK	1	0	0	22.12
				1	12	0	22.24
				1	24	0	22.20
				12	0	1	21.14
				12	6	1	21.16
				12	11	1	21.16
				25	0	1	21.15
			16QAM	1	0	1	21.07
				1	12	1	21.20
				1	24	1	21.15
				12	0	2	21.14
				12	6	2	21.15
				12	11	2	21.15
				25	0	2	20.21
	40620	2593.0	QPSK	1	0	0	23.24
				1	12	0	23.34
				1	24	0	23.19
				12	0	1	23.19
				12	6	1	23.21
				12	11	1	23.16
				25	0	1	23.21
			16QAM	1	0	1	23.45
				1	12	1	23.44
				1	24	1	23.38
				12	0	2	23.22
				12	6	2	23.20
				12	11	2	23.22
				25	0	2	22.13
	41216	2652.6	QPSK	1	0	0	22.39
				1	12	0	22.62
				1	24	0	22.72
				12	0	1	21.61
				12	6	1	21.64
				12	11	1	21.65
				25	0	1	21.60
			16QAM	1	0	1	21.41
				1	12	1	21.62
				1	24	1	21.67
				12	0	2	21.63
				12	6	2	21.63
				12	11	2	21.64
				25	0	2	20.61

According to 3GPP 36.521 sub-clause 6.2.3.3, the maximum output power is allowed to be reduced by following the table.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (For PRACH, PUCCH and SRS transmission, the allowed MPR is according to that specified for PUSCH QPSK modulation for the corresponding transmission bandwidth.).

When PRACH, PUCCH are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

For each subframe, the MPR is evaluated per slot and given by the maximum value taken over the transmission(s) within the slot, the maximum MPR over the two slots is then applied for the entire subframe.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply. The normative reference for this requirement is TS 36.101 clause 6.2.3.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

6.2 RADIATED OUTPUT POWER

6.2.1 MEASUREMENT METHOD

The measurements procedures specified in ANSI/TIA-603-E-2016 were applied.

1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.

2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.

4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

5 The EUT is then put into continuously transmitting mode at its maximum power level.

6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 27.50(d)(4). The "reference path loss" from Step1 is added to this result.

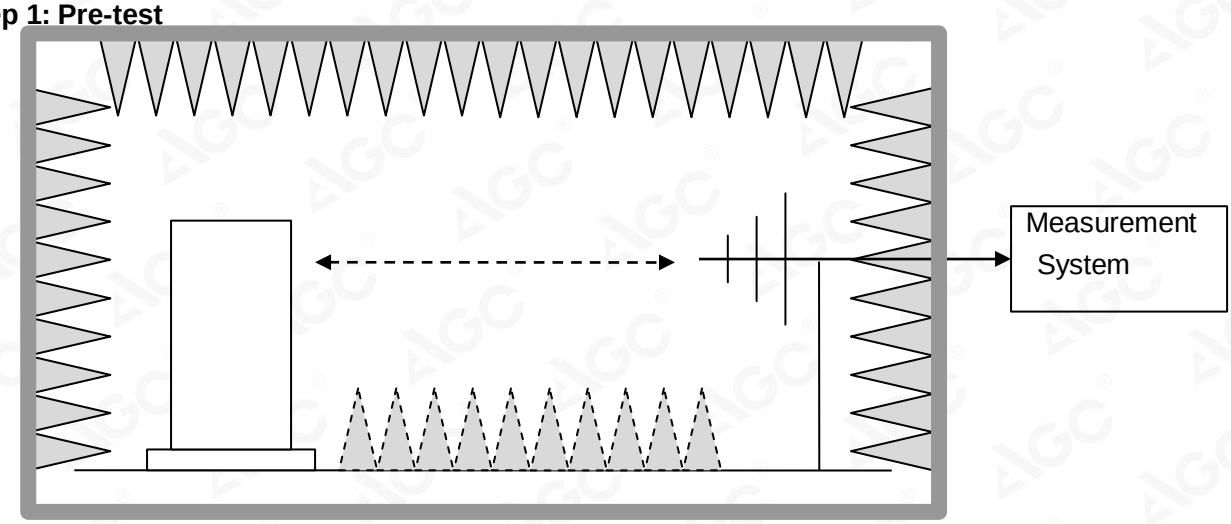
7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).

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

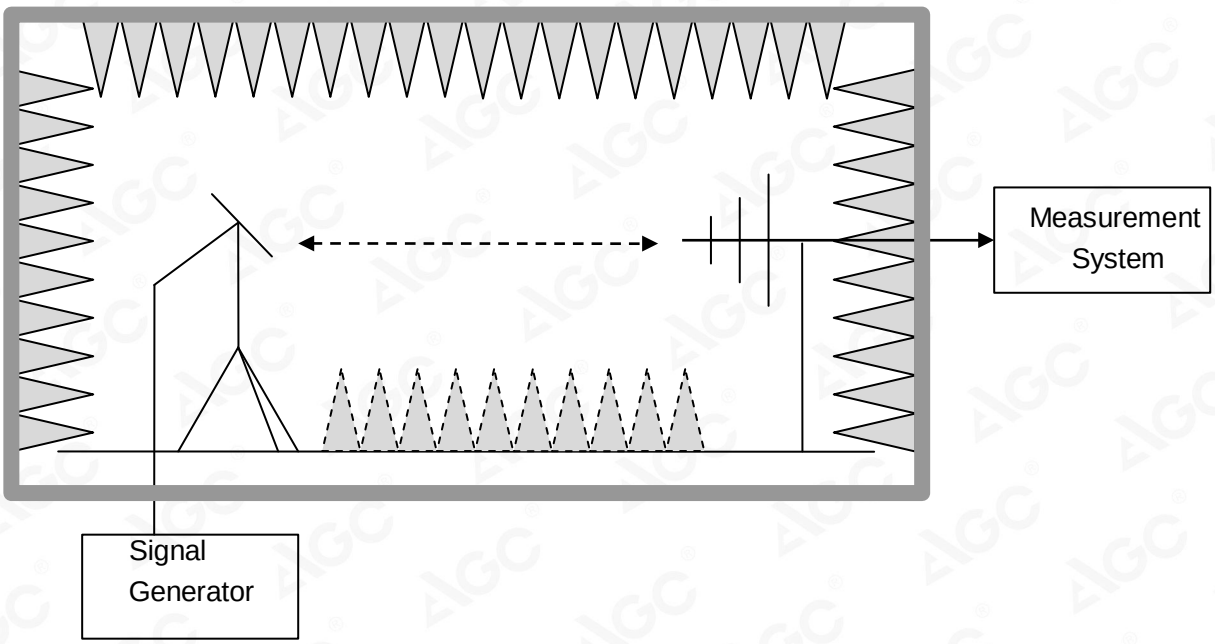
Test Setup

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP



6.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(c) specifies, “Mobile/portable stations are limited to 2 watts e.i.r.p.

Mode	FCC Part Section(s)	Nominal Peak Power
LTE Band 2	24.229(b)	<=33dBm (2W)
LTE Band 5	22.905(a)	<=38.45dBm (7W)
LTE Band 7	27.50(i)(2)	<=33dBm (2W)
LTE Band 12	27.5(c)	<=34.77dBm(3W)
LTE Band 17	27.5(c)	<=34.77dBm(3W)
LTE Band 40	27.50(a)	<=33dBm (2W)
LTE Band 41	27.50(i)(2)	<=33dBm (2W)

6.2.3 MEASUREMENT RESULT

EIRP for LTE Band 2

Frequency	Channel Bandwidth	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
1850.7	1.4	QPSK	1/0	9.94	V	7.95	0.79	17.10	33
1880.0	1.4	QPSK	1/0	7.99	V	7.95	0.79	15.15	33
1909.3	1.4	QPSK	1/0	7.24	V	7.95	0.79	14.40	33
1850.7	1.4	QPSK	1/0	9.42	H	7.95	0.79	16.58	33
1880.0	1.4	QPSK	1/0	8.94	H	7.95	0.79	16.10	33
1909.3	1.4	QPSK	1/0	8.68	H	7.95	0.79	15.84	33
1850.7	1.4	16-QAM	1/5	7.47	V	7.95	0.79	14.63	33
1880.0	1.4	16-QAM	1/0	9.51	V	7.95	0.79	16.67	33
1909.3	1.4	16-QAM	1/0	7.39	V	7.95	0.79	14.55	33
1850.7	1.4	16-QAM	1/5	8.92	H	7.95	0.79	16.08	33
1880.0	1.4	16-QAM	1/0	7.96	H	7.95	0.79	15.12	33
1909.3	1.4	16-QAM	1/0	10.10	H	7.95	0.79	17.26	33
1851.5	3	QPSK	1/0	6.72	V	7.95	0.79	13.88	33
1880.0	3	QPSK	1/0	10.17	V	7.95	0.79	17.33	33
1908.5	3	QPSK	1/0	10.07	V	7.95	0.79	17.23	33
1851.5	3	QPSK	1/0	7.80	H	7.95	0.79	14.96	33
1880.0	3	QPSK	1/0	8.79	H	7.95	0.79	15.95	33
1908.5	3	QPSK	1/0	8.15	H	7.95	0.79	15.31	33
1851.5	3	16-QAM	1/0	10.24	V	7.95	0.79	17.40	33
1880.0	3	16-QAM	1/0	9.40	V	7.95	0.79	16.56	33
1908.5	3	16-QAM	1/0	7.32	V	7.95	0.79	14.48	33
1851.5	3	16-QAM	1/0	7.43	H	7.95	0.79	14.59	33
1880.0	3	16-QAM	1/0	11.70	H	7.95	0.79	18.86	33
1908.5	3	16-QAM	1/0	13.22	H	7.95	0.79	20.38	33
1852.5	5	QPSK	1/0	14.28	V	7.95	0.79	21.44	33
1880.0	5	QPSK	1/0	14.15	V	7.95	0.79	21.31	33
1907.5	5	QPSK	1/24	14.60	V	7.95	0.79	21.76	33
1852.5	5	QPSK	1/0	13.07	H	7.95	0.79	20.23	33
1880.0	5	QPSK	1/0	9.26	H	7.95	0.79	16.42	33
1907.5	5	QPSK	1/24	8.31	H	7.95	0.79	15.47	33
1852.5	5	16-QAM	1/0	9.24	V	7.95	0.79	16.40	33
1880.0	5	16-QAM	1/0	8.05	V	7.95	0.79	15.21	33
1907.5	5	16-QAM	1/24	7.11	V	7.95	0.79	14.27	33

1852.5	5	16-QAM	1/0	10.92	H	7.95	0.79	18.08	33
1880.0	5	16-QAM	1/0	10.15	H	7.95	0.79	17.31	33
1907.5	5	16-QAM	1/24	8.20	H	7.95	0.79	15.36	33
1855	10	QPSK	1/0	8.44	V	7.95	0.79	15.6	33
1880	10	QPSK	1/49	9.27	V	7.95	0.79	16.43	33
1905	10	QPSK	1/0	7.36	V	7.95	0.79	14.52	33
1855	10	QPSK	1/0	7.09	H	7.95	0.79	14.25	33
1880	10	QPSK	1/49	7.60	H	7.95	0.79	14.76	33
1905	10	QPSK	1/0	9.40	H	7.95	0.79	16.56	33
1855	10	16-QAM	1/0	9.40	V	7.95	0.79	16.56	33
1880	10	16-QAM	1/49	8.18	V	7.95	0.79	15.34	33
1905	10	16-QAM	1/0	7.60	V	7.95	0.79	14.76	33
1855	10	16-QAM	1/0	7.94	H	7.95	0.79	15.1	33
1880	10	16-QAM	1/49	7.27	H	7.95	0.79	14.43	33
1905	10	16-QAM	1/0	8.86	H	7.95	0.79	16.02	33
1857.5	15	QPSK	1/0	10.20	V	7.95	0.79	17.36	33
1880	15	QPSK	1/74	11.80	V	7.95	0.79	18.96	33
1902.5	15	QPSK	1/0	12.09	V	7.95	0.79	19.25	33
1857.5	15	QPSK	1/0	11.17	H	7.95	0.79	18.33	33
1880	15	QPSK	1/74	10.00	H	7.95	0.79	17.16	33
1902.5	15	QPSK	1/0	9.98	H	7.95	0.79	17.14	33
1857.5	15	16-QAM	1/0	9.12	V	7.95	0.79	16.28	33
1880	15	16-QAM	1/74	12.34	V	7.95	0.79	19.5	33
1902.5	15	16-QAM	1/0	7.79	V	7.95	0.79	14.95	33
1857.5	15	16-QAM	1/0	8.46	H	7.95	0.79	15.62	33
1880	15	16-QAM	1/74	11.21	H	7.95	0.79	18.37	33
1902.5	15	16-QAM	1/0	7.94	H	7.95	0.79	15.1	33
1860	20	QPSK	1/99	9.63	V	7.95	0.79	16.79	33
1880	20	QPSK	1/99	10.44	V	7.95	0.79	17.6	33
1900	20	QPSK	1/0	9.58	V	7.95	0.79	16.74	33
1860	20	QPSK	1/99	8.16	H	7.95	0.79	15.32	33
1880	20	QPSK	1/99	11.56	H	7.95	0.79	18.72	33
1900	20	QPSK	1/0	9.34	H	7.95	0.79	16.5	33
1860	20	16-QAM	1/99	9.24	V	7.95	0.79	16.4	33
1880	20	16-QAM	1/99	10.81	V	7.95	0.79	17.97	33
1900	20	16-QAM	1/0	10.54	V	7.95	0.79	17.7	33
1860	20	16-QAM	1/99	9.24	H	7.95	0.79	16.4	33

1880	20	16-QAM	1/99	9.79	H	7.95	0.79	17.87	33
1900	20	16-QAM	1/0	8.38	H	7.95	0.79	16.61	33