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Report On

FCC and IC Testing of the CBRSYS6500 in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 27

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2AQSOCBRSYS6500

PREPARED BY

liktorov

Nikolai Viktorov Test Personnel October 2018

APPROVED BY

DATED

Drysdale

Scott Drysdale Authorised Signatory

December 18, 2018

Page 1 of 37

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SECTION 1

REPORT INFORMATION



1.1 REPORT DETAILS

Manufacturer	Octasic inc.
Address	300-401 Molson St, Montreal, QC, H1Y 3L1
Product Name	CBRSYS6500 (CBRRFE6400+CBRSYS6000)
Product Number	CBRSYS6000 - CBRSYS6008-RE-3E CBRRFE6400 - CBRRFE6407-NC100-EE1
Serial Number(s)	CBRSYS6000 – F-00190 CBRRFE6400 – K-15468
Hardware Version	CBRSYS6000 - 3.0 CBRRFE6400 - 3.1
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2016 FCC CFR 47 Part 27: 2016
Start of Test	October 12, 2018
Finish of Test	December 17, 2018
Name of Test Personnel(s)	Scott Drysdale and Nikolai Viktorov
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 27 is shown below.

		Specification Clause		
Section	FCC CFR 47 Part 2	FCC CFR 47 Part 27	Test Description	Result
2.1	2.1046	27.50	Maximum Peak Output Power, ERP, and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (h)	Band Edge	Pass
2.4	2.1051	27.53 (h)	Transmitter Spurious Emissions	Pass
2.5	2.1055	27.54	Frequency Stability	Pass
-	-	15.111	Receiver Spurious Emissions	N/A ¹

 N/A^1 – Not Applicable, as this is a transceiver.



1.3 CONFIGURATION DESCRIPTION

The CBRSYS6500 supports Single Mode operation from a single port configuration.

The CBRSYS6500 supports CDMA2K in Band 15 (2110 MHz - 2155 MHz).

TX test cases: Maximum Conducted Output Power, Spurious Emissions at Antenna Terminals (\pm 1MHz) and Conducted Spurious Emissions, measurements were performed on the RF Port. The test limits shown are representative of the worst case. All testing was performed with the EUT transmitting at maximum RF power unless as designated setting by client, otherwise stated.

The EUT was powered via a 120V 60Hz power supply.

CDMA2K B15 (2110 MHz - 2155 MHz) Channel Configurations

All tests

ſ	RAT	No. of	Carrier Bandwidth	Carrier Fre	equency Configuration	(MHz)
	RA I	Carriers (MHz)	Bottom (BRFBW)	Middle (MRFBW)	Top (TRFBW)	
	С	1	1.48	2111.25 + 2112.5	2132.5	2152.5 + 2153.75



1.4 DECLARATION OF BUILD STATUS

	MAIN EUT					
MANUFACTURING DESCRIPTION	CBRSYS6500					
MANUFACTURER	Octasic inc.					
ТҮРЕ	Portable Base Station Unit with Transportable Amplification Unit					
PART NUMBER	CBRSYS6000 - CBRSYS6008-RE-3E CBRRFE6400 - CBRRFE6407-NC100-EE1					
SERIAL NUMBER	CBRSYS6000 – F-00190 CBRRFE6400 – K-15468					
HARDWARE VERSION	CBRSYS6000 - 3.0 CBRRFE6400 - 3.1					
TRANSMITTER OPERATING RANGE	B15 2110 – 2155 MHz					
RECEIVER OPERATING RANGE	B15 1710 – 1755 MHz					
COUNTRY OF ORIGIN	CBRSYS6000 - India CBRRFE6400 - Canada					
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	CDMA2K:G7W					
MODULATION TYPES: (i.e. GMSK, QPSK)	CDMA2K: QPSK					
HIGHEST INTERNALLY GENERATED FREQUENCY	2155 MHz					
OUTPUT POWER (W or dBm)	20W					
FCC ID	2AQSOCBRSYS65000					
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The Transportable Amplification Unit (TAU) is a powerful multiband RF front-end (RFE) designed for use as a Transportable Amplification Unit (TAU) in conjunction with a Portable Base station Unit (PBU). The EUT fits in a standard 19" 6U rack.					



1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) operates from a 120V 60Hz supply.

The CBRRFE6400 Transportable Amplification Unit (TAU) is a powerful multiband RF front-end (RFE) designed for use as a Transportable Amplification Unit (TAU) in conjunction with a Portable Base station Unit (PBU) such as the CBRSYS6000. The TAU ships in a ruggedized case and fits in a standard 19" 6U rack. Depending on band configuration it can support up to 8 bands. It has a high sensitivity multiband receiver and an interference mitigation and suppression mechanism to maintain sensitivity in the presence of interference. The transmitter can transmit up to 100W peak per band.

The TAU has automatic RF power control per band for coverage optimization and a standby mode to optimize power consumption.

The CBRSYS6000 Portable Base station Unit (PBU) is multi-channel, software-defined radio (SDR) based base station system for wireless applications like Network in a Box (NIB). It is designed to fit in a standard 19" 3U rack-two PBUs can be fit in a standard 3U rack and ships in a ruggedized 3U rackmount case.

The PBU has a basic RF front end that internally combines the TX signals and splits the RX signals of each SDR. It can be coupled with a high-power RF front end Transportable Amplification Unit (TAU) such as the CBRRFE6400 for a complete system. The PBU is controlled over wired Ethernet and has a USB service port for maintenance access to the serial ports of each SDR. The PBU has built-in fans for thermal management.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.

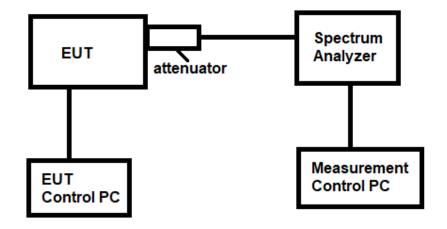


Equipment Under Test





1.6 TEST SETUP





1.7 TEST CONDITIONS

For all tests, the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or a chamber as appropriate.

The EUT was powered from a 120V 60Hz supply.

FCC Measurement Facility Accreditation Designation Number: CA6845 - TUV SUD Canada (Laval)

1.8 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.10 ALTERNATIVE TEST SITE

Under our Accreditation, TÜV SÜD Canada, Laval conducted the following tests at the TÜV SÜD Canada, Ottawa location.

1.11 ADDITIONAL INFORMATION

The CBRSYS6000 Portable Base station Unit (PBU) is multi-channel, software-defined radio (SDR) based base station system for wireless applications like Network in a Box (NIB). It is designed to fit in a standard 19" 3U rack-two PBUs can be fit in a standard 3U rack and ships in a ruggedized 3U rackmount case.

Depending on band configuration it can support up to 8 bands. It has a high sensitivity multiband receiver and an interference mitigation and suppression mechanism to maintain sensitivity in the presence of interference. The transmitter can transmit up to 100W peak per band.



SECTION 2 TEST DETAILS



1.12 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

1.12.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046 FCC CFR 47 Part 27, Clause 27.50

1.12.2 Date of Test and Modification State

November 28, 2018 - Modification State 0

1.12.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

1.12.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

1.12.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

1.12.6 Test Results



Maximum Target Output Power 40 dBm

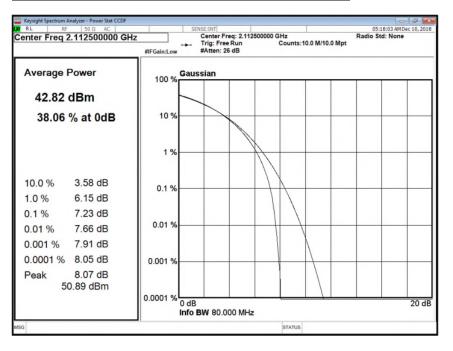
Γ	Antenna		Carrier Bandwidth	Peak to Ave	erage Ratio (PAR) /	Output Power
				Channel Position B		
		Modulation			Average Power	
				PAR (dB)	dBm	dBm/MHz
	А	QPSK	1.48 MHz	7.86	39.89	38.90

Reysight Sp 02:36:15 AM Nov 28, 2018 Radio Std: None Center Freq 2.111250000 GHz SENSE:INT Center Freq: 2.111250000 GHz Trig: Free Run Counts:10.0 M/10.0 Mpt #Atten: 24 dB #IFGain:Low Average Power Gaussian 100 % 39.84 dBm 37.60 % at 0dB 10 % 1% 10.0 % 3.58 dB 0.1 % 1.0 % 6.39 dB 0.1 % 7.86 dB 0.01 % 8.76 dB 0.01 % 0.001 % 9.69 dB 0.0001 % 10.00 dB 0.001 % 10.03 dB Peak 49.87 dBm 0.0001 % 0 dB Info BW 80.000 MHz 20 dB STATUS



Maximum Target Output Power 43 dBm

Antenna		Carrier Bandwidth	Peak to Ave	erage Ratio (PAR) /	Output Power
			Channel Position B2		
	Modulation			Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.48 MHz	7.23	42.73	41.90





Maximum Target Output Power 43 dBm

	Antenna		Carrier Bandwidth	Peak to Ave	erage Ratio (PAR) /	Output Power
				Channel Position M		
		Modulation			Average Power	
				PAR (dB)	dBm	dBm/MHz
	А	QPSK	1.48 MHz	7.27	42.8	41.94

Keysight Sp RL 02:16:48 AM Nov 28, 2018 Radio Std: None Center Freq 2.132500000 GHz SENSE:INT Center Freq: 2.132500000 GHz — Trig: Free Run Counts:10.0 M/10.0 Mpt #Atten: 26 dB #IFGain:Low Average Power Gaussian 100 % 42.78 dBm 38.05 % at 0dB 10 % 1% 10.0 % 3.60 dB 0.1 % 1.0 % 6.16 dB 0.1 % 7.27 dB 0.01 % 0.01 % 7.78 dB 0.001 % 8.00 dB 0.0001 % 8.06 dB 0.001 % 8.07 dB Peak 50.85 dBm 0.0001 % 0 dB Info BW 80.000 MHz 20 dB STATUS



Maximum Target Output Power 43 dBm

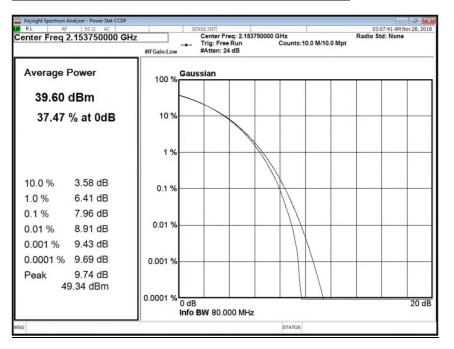
Antenna		Carrier Bandwidth	Peak to Ave	erage Ratio (PAR) /	Output Power
			Channel Position T2		
	Modulation			Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.48 MHz	7.30	42.93	41.92

Keysight Spectrum Analyzer - Power Stat CCDF		
RL RF 50 Ω AC Center Freq 2.152500000 GHz	SENSE:INT Center Freq: 2.152500000 GHz	06:01:38 AM Dec 10, 201 Radio Std: None
	#IFGain:Low #Atten: 26 dB	
Average Power	100 % Gaussian	
42.83 dBm		
37.91 % at 0dB	10 %	
	1 %	
10.0 % 3.60 dB	0.1 %	
1.0 % 6.18 dB 0.1 % 7.30 dB		
0.01 % 7.81 dB 0.001 % 7.97 dB	0.01 %	
0.0001 % 8.09 dB Peak 8.11 dB	0.001 %	
50.94 dBm	0.0001 %	
	0 dB Info BW 80.000 MHz	20 di
G	STATUS	



Maximum Target Output Power 40 dBm

Antenna			Peak to Average Ratio (PAR) / Output Power		
		Carrier Bandwidth	Channel Position T		
	Modulation			Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.48 MHz	7.96	39.71	38.67



Limit	
Peak to Average Ratio	13 dB



1.13 OCCUPIED BANDWIDTH

1.13.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 27, Clause 27.53

1.13.2 Date of Test and Modification State

November 28, 2018 - Modification State 0

1.13.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

1.13.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

1.13.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

1.13.6 Test Results

Maximum Target Output Power B:40dBm M:43dBm T:40dBm

			-		Result	: (KHz)					
Antenn	a Modulation	Carrier	Indulation		Position B	Channel F	Position M	Channel I	Position T		
/		Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth			
А	QPSK	1.48 MHz	1260.31	1413.31	1264.05	1415.53	1263.85	1412.08			



Antenna A - Bandwidth QPSK - Channel B

Keysight Spectrum Analyzer - Occupied BW				
RL RF 50 Ω AC	Clin	SENSE:INT Center Freq: 2.111250000	GH7	02:36:58 AM Nov 28, 20 Radio Std: None
enter Freq 2.111250000	GHZ	Trig: Free Run	Avg Hold: 50/50	Radio Stu. None
	#IFGain:Low	#Atten: 24 dB		Radio Device: BTS
dB/div Ref 37.10 dBm 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
9				
.9				
enter 2.111 GHz tes BW 13 kHz		#VBW 39 kHz		Span 2.5 M Sweep 18.27 r
Occupied Bandwidt	h	Total Power	40.0 dBm	
1.:	2603 MHz			
Transmit Freq Error	1.764 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	1.413 MHz	x dB	-26.00 dB	

Antenna A - Bandwidth QPSK - Channel M

Keysight Spectrum Analyzer - Occupied BW	1	SENSE:INT		02:17:22 AM Nov 26, 20
Center Freq 2.132500000	GHz #FGain:Low	Center Freq: 2.132500000	GHz Avg Hold: 50/50	Radio Std: None Radio Device: BTS
10 dB/div Ref 39.87 dBm	1			
29.9	m		manna	
9.87	Á –			
0.1				hamman
0.1				
0.1				
0.1				
enter 2.133 GHz Res BW 13 kHz		#VBW 39 kHz		Span 2.5 Mi Sweep 18.27 n
Occupied Bandwidt	h	Total Power	42.9 dBm	
1.:	2640 MHz			
Transmit Freq Error	1.597 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	1.416 MHz	x dB	-26.00 dB	
G			STATUS	



Antenna A - Bandwidth QPSK - Channel T

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω AC		SENSE:INT		03:08:15 AM Nov 28, 20
enter Freq 2.153750000		Center Freq: 2.153750000		Radio Std: None
	#IFGain:Low	#Atten: 24 dB	Avg Hold: 50/50	Radio Device: BTS
dB/div Ref 36.81 dBm	۱ 			
6		men mannen mannen	mumm	
8	A law		- manager	
n			1	
9				
2 mmmmmmm				hannannen
-				
2				
2				
2				
enter 2.154 GHz tes BW 13 kHz		#VBW 39 kHz		Span 2.5 M Sweep 18.27 r
Occupied Bandwidt	h	Total Power	39.8 dBm	
1.:	2639 MHz			
Transmit Freq Error	610 Hz	% of OBW Power	99.00 %	
x dB Bandwidth	1.412 MHz	x dB	-26.00 dB	



1.14 BAND EDGE

1.14.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 FCC CFR 47 Part 27, Clause 27.53 (h)

1.14.2 Date of Test and Modification State

November 28, 2018- Modification State 0

1.14.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

1.14.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

1.14.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6. The EUT was connected to a Spectrum Analyser via an attenuator and switching box. The path loss between the EUT and the Spectrum Analyser was measured using a Network Analyser. The measured path loss was entered as a Reference Level Offset in the Spectrum Analyser. The Spectrum Analyser RBW was adjusted to be at least 1% of the measured 26dB Bandwidth. Using an RMS detector, the frequency spectrum up to 1MHz away from the Band Edge was Investigated.

The EUT has one transmit port, testing was performed on this port with a test limit of $43+10\log(P) = -13 \text{ dBm}$.

1.14.6 Test Results

Maximum Target Output Power T:40dBm B:40dBm

Antonno	Madulation	Corrier Denduidth	Band Edge (MHz)			
Antenna	Modulation	Carrier Bandwidth	Channel Position B	Channel Position T		
A	QPSK	1.48 MHz	2111.25	2153.75		



Antenna A - Modulation QPSK - Channel B, 1.48 MHz

	t Spect		alyzer - Swept S							00
RL arker	22	RF 2.110	50 Ω A	000 GHz		SE:INT]	Avg	Type: RMS		RACE 1 2 3 4
				PNO IFGa		Trig: Free Run #Atten: 18 dB				DET A N N N
dB/di)ffset 36.5 d 38.50 dBi					Ban	Mkr2 2.110 d Power -1	000 GH 9.53 dB
g						I				
15							6	m	many	
50										
- 0										
5		_				2		_		DL1-13.00
.5		_		1		- Anna	manan			
5					and a state of the	-				
5										
5		_							_	
enter	2.1	1000	0 GHz						Spar	1 5.000 M
les B					#VBW	130 kHz*		#\$	Sweep 5.000	s (1001 p
R MODE	E TRO	SCL f	_	x 2.109 000 GHz	20.20 dD		FUNCTION WIDT		FUNCTION VALUE	45.00 4
N	1	f	2	2.110 000 GHz	-19.39 dB	m Band Powe m Band Powe				-15.96 di -19.53 di
i										
8	-									
	-									
í										
						m				,
							STATI			

Antenna A - Modulation QPSK - Channel T, 1.48 MHz

Keysight Spi RL	ectrum Analyzer -	Swept SA	SENSE:1	NT		1	03:09	27 AM Nov 28, 20
		0000000 GHz	Wide Tri	g: Free Run tten: 18 dB	Avg Typ	e: RMS		TYPE WWWW DET A N N N
0 dB/div	Ref Offset Ref 38.5						Akr2 2.15 Power -2	
og 28.5					_		_	
8,5	-17		-			_		
50	1							
.5				2	_	_	_	DL1 -13.00
1.5	man				~~~~	1		
.5								
1.5								mananan
enter 2. Res BW	155000 GH 30 kHz	łz	#VBW 13	0 kHz*		#Sv	Spa veep 5.000	n 5.000 M s (1001 p
GI MODE TR	IC SCL	2,156 000 GHz	34.15 dBm	FUNCTION Band Power	FUNCTION WIDTH		FUNCTION VALUE	-17.84 dE
2 N 1 3	f	2.155 000 GHz		Band Power	30.00 kHz			-21.04 dE
7								
9								
1				m				•
3					STATUS			



Maximum Target Output Power B2:40dBm T2:40dBm

Antonno	Madulation	Corrier Dependerighth	Band Edge (MHz)			
Antenna	Modulation	Carrier Bandwidth	Channel Position B2	Channel Position T2		
А	QPSK	1.48 MHz	2112.5	2152.5		

Antenna A - Modulation QPSK - Channel B2, 1.48 MHz

arke	r 2 1	RF 2.110	50 Q AC	00 GHz	IO: Wide		: Free Run ten: 22 dB		Avg Type	RMS		TRACE 1 2 3 4 1 TYPE WWWW DET A NNNI
dB/d	iv		ffset 36.5 dE 42.50 dBm								Mkr2 2.11 Power -2	
2.6		_					_	-			-	
		-						-			1	
2.6		-				-						_
50		-				-						
- 0						-	_				mannel	DL1 -13.00 d
5		-				-	2	-	North March			
5		-			1		9					
5		-		and	-	-						
5							-	-				
		1000 30 kH	0 GHz z		#VE	W 13	0 kHz*			#S	Spa weep 5.000	n 5.000 MH s (1001 pt
R MOD			>		Y		FUNCTION				FUNCTION VALUE	
N N N	1	f		109 000 GHz 110 000 GHz			Band Power Band Power		000 MHz 0.00 kHz			-22.17 dB -28.70 dB
	-	\square				_		_	-			
		\square										
					-							
4												

Antenna A - Modulation QPSK - Channel T2, 1.48 MHz

arke	r 2 2		50 Ω AC			E:INT	Avg Typ	e: RMS	06:0	TRACE 1 2 3 4 TVPE WWWW
						Atten: 22 dB				DETANNN
0 dB/di			et 36.5 dB 50 dBm							5 000 GH 29.77 dB
2.5	-	~								
2.5		1								
.50										
50			hanne							
-		_		and a summer of	*14				-	DL1 -13.00 d
7.5					and the second	6 ²				
7.5							and a state of the	∲ ¹	_	
7.5								and the second second	menne	
7.5										
		5000 C	SHz							an 5.000 Mi
Res E		0 kHz			#VBW	130 kHz*		#S\	-	0 s (1001 pi
_	IEI TRC	f	2.1	56 000 GHz	-38.91 dB	Band Power	FUNCTION WOTH 1,000 MHz		FUNCTION VALU	-22.80 dB
KR MOD				55 000 GHz	-29,40 dB	n Band Power	30.00 kHz			-29.77 dB
1 N 2 N		f	2,1							
1 N 2 N 3 4		f	2.1							
1 N 2 N 3 4		f	2.1							
1 N 2 N 3 4 5 6 7		f	2,1							
1 N 2 N 3 4 5 6 7 8 9		f	2.1							
1 N 2 N 3 4 5 6 7 8		f	2.1							
1 N 2 N 3 4 5 6 7 8 9 0		f	2.1							,

Limit	-13 dBm



1.15 TRANSMITTER SPURIOUS EMISSIONS

1.15.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 FCC CFR 47 Part 27, Clause 27.53 (h)

1.15.2 Date of Test and Modification State

November 28, 2018- Modification State 0

1.15.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

1.15.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity35%

1.15.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6. The EUT was connected to a Spectrum Analyser via an attenuator and switching box. Prior to testing, a Network Analyser was used to calibrate the path loss between the EUT and the Spectrum Analyser. The worst-case path loss in the measured ranges was entered as a reference level offset. Over the measured ranges, the RBW was set to 1MHz with a VBW of 3MHz. All measurement results are specified as average with an RMS detector being used in conjunction with a trace setting of Max Hold. Measurements were performed in configurations of the EUT as reported below.

Testing was performed on this port with a test limit of $43+10\log(P) = -13$ dBm.

1.15.6 Test Results

Maximum Target Output Power B:40dBm, M:43dBm, T:40dBm CDMA2K 1.48 MHz Bandwidth setting



Antenna A - Modulation QPSK - Channel B

fLeve	RF 50 Ω▲					#Avg Type: RMS		TRACE 1 2 3 4
		NFE	PNO: Fast -+ IFGain:Low	#Atten: 30	dB			DET A N N N
B/div	Ref Offset 36.5 Ref 50.50 dB	dB						111 3 GI 38.39 dB
·								
5		-			♦ ¹			
5								
5			_					-
5		_						
• —								
								DL1 -13.00 d
5		-						
6	_		_					dist.
5				المرادر والمراجع	and black	التو الالانت المالي وأواس الدرمانية.	Contraction of the second	Marrie a
WHAT I		Sector - hearing	Street Street Street Street, Street, St.	A design the second				
es BW	1.0 MHz ectrum Analyzer - Swept RF 50 Ω	AC		SENSE:INT	*		Sweep 8.000	s (8000 pt
(eysight Sp R.L	1.0 MHz	AC			Run	# #Avg Type: RMS	Sweep 8.000	39 AM Nov 28, 20
es BW RL nter F	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AM Nov 28, 20 TRACE 1 2 3 4 TYPE WWWW DET A N N N 002 5 GH
es BW	1.0 MHz estrum Analyzer - Swept RF 50 Ω Freq 8.000000	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AM Nov 28, 20 TRACE 1 2 3 4 TYPE WWWW DET A N N N
es BW	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AM Nov 28, 20 TRACE 1 2 3 4 TYPE WWWW DET A N N N 002 5 GH
es BW	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AM Nov 28, 20 TRACE 1 2 3 4 TYPE WWWW DET A N N N 002 5 GH
es BW	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AM Nov 28, 20 TRACE 1 2 3 4 TYPE WWWW DET A N N N 002 5 GH
es BW	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA
dB/div	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA
dB/div	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA
dB/div	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA
Consider SBW	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA
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ceveral the second seco	1.0 MHz	AC 000 GHz NFE dB	PNO: Fast →	SENSE:INT	Run		Sweep 8.000 02:39 Mkr1 4.	39 AN Nov 28, 24 19 AN Nov 28, 24 19 PAN Nov 28 19 PA



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		NFE F	Gain:Low	Trig: Free #Atten: 10					DET A NNN
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	000 GHz / 1.0 MHz		#VB	W 3.0 MHz	*		#Swee	Stop 12.00 s	18.000 GI

enter F	req 22.25000	NFE	PNO: Fast	. Trig: Free #Atten: 10		#Avg Type:	RMS	T	2 AM Nov 28, 201 RACE 1 2 3 4 5 TYPE WWWW DET A N N N N
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Keysight Sp RL enter F	1.0 MHz ectrum Analyzer - Swept 3 RF 50 0 4 req 8.0000000 Ref Offset 37.5 c	IDOO GHZ		SENSE:INT	e Run		Sweep 8.00 02:1 Mkr1 6	8:53 AM Nov28, 20 TRACE [1 2 3 4 5 TYPE WWWW DET A NNN 3:397 6 GH
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RL RF	50 Ω AC		SENSE:INT		#Avg Type:	RMS	TR	AM Nov 28, 20
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tart 12.000 GHz Res BW 1.0 MHz			W 3.0 MHz				Stop 1	8.000 GI

enter F	req 22.2	500000	NFE	PNO: Fast	Trig: Free #Atten: 10	#Avg Type:	RMS	TF	TYPE WWWW
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	000 GHz 1.0 MHz				W 3.0 MHz			Stop 2 p 17.00 s	26.500 GH



Leve	RF 50 Ω ▲				-	#Avg Type: RMS		TRACE 1 2 3 4
		NFE	PNO: Fast - IFGain:Low	 Trig: Free #Atten: 30 	Run dB			DET A NN
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eysight Spi	1.0 MHz ectrum Analyzer - Swept RF 50 Ω	AC	#V	BW 3.0 MHz	2*		Sweep 8.00	0 s (8000 p
eysight Spr	1.0 MHz	AC	PNO: Fast	SENSE:INT	Run	#4 #Avg Type: RMS	Sweep 8.00	0 s (8000 p
eysight Spr	1.0 MHz ectrum Analyzer - Swept RF 50 Ω	000 GHz		SENSE:INT	Run		Sweep 8.00	0 s (8000 p 0.57 AM Nov 28, 2 TRACE 1 2 3 4 TYPE WWWW DET A N N
eysight Spo RL nter F	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0.57 AM Nov 28, 2 TRACE 1 2 3 4 TYPE WWWW DET A N N M
eysight Spr	1.0 MHz ectrum Analyzer - Swept 3 RF 50 Q 3 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	op 4.000 G 0 s (8000 p 0:57 AM Nov 28, 2 TRACE [12 3 4 TYPE] DET A NNN 0.461 2 G -32.57 dE
es BW eysight Spr RL Inter Fl IB/div	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0.57 AM Nov 28, 2 TRACE 1 2 3 4 TYPE WWWW DET A N N M
eysight Spr RL Inter Fi	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0.57 AM Nov 28, 2 TRACE 1 2 3 4 TYPE WWWW DET A N N M
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eysight Spa RL Inter Fr	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0.57 AM Nov 28, 2 TRACE 1 2 3 4 TYPE WWWW DET A N N M
eysight Spa RL Inter Fr	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PC [W 304 0 ETA NNM 3.461 2 G -32.57 dE
es BW	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast IFGain:Low	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PC [W 304 0 ETA NNM 3.461 2 G -32.57 dE
es BW	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PE [W 304 0 ETA NNN 3.461 2 G -32.57 dE
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es BW	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast IFGain:Low	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PE [W 304 0 ETA NNN 3.461 2 G -32.57 dE
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exclust Spectral Research Spec	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast IFGain:Low	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PE [W 304 0 ETA NNN 3.461 2 G -32.57 dE
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estight Spanson Record of the spanson of the spanso	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast IFGain:Low	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PE [W 304 0 ETA NNN 3.461 2 G -32.57 dE
es BW	1.0 MHz estrum Analyzer - Swept: RF 50 Ω = 1 req 8.0000000	AC 000 GHz NFE dB	PNO: Fast IFGain:Low	SENSE:INT	Run		Sweep 8.00 03:1 Mkr1 6	0 s (8000 p 0 57 AM Nov 28, 3 17ACE [12, 3 17PE [W 304 0 ETA NNN 3.461 2 G -32.57 dE



RL RF 50 Ω AC	SENSE:INT		03:11:21 AM Nov 28, 201
enter Freq 15.000000000			AS TRACE 1 2 3 4 5 TYPE WWWWW DET A N N N
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tart 12.000 GHz Res BW 1.0 MHz	#VBW 3.0 MH	*	Stop 18.000 GF #Sweep 12.00 s (12000 pt

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26.500 GH		#Swee	*	W 3.0 MH	#VB			.000 GH V 1.0 M	

Limit -13dBm



1.16 FREQUENCY STABILITY

1.16.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055 FCC CFR 47 Part 27, Clause 27.54

1.16.2 Date of Test and Modification State

October 12 and 15th, 2018 - Modification State 0

1.16.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

1.16.4 Environmental Conditions

Ambient Temperature23°CRelative Humidity36%

1.16.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

1.16.6 Test Results

Maximum Target Output Power 43 dBm

Tamparatura	Veltere	Frequency Error (Hz)
Temperature	Voltage	Channel Position M
-30°C	120V AC	EUT non-operational
-20°C	120V AC	EUT non-operational
-10°C	120V AC	0
0°C	120V AC	5
+10°C	120V AC	0
+20°C	99V AC	0
+20°C	120V AC	5
+20°C	135V AC	0
+30°C	120V AC	0
+40°C	120V AC	0
+50°C	120V AC	0

Limit +/- 1 ppm



SECTION 3

TEST EQUIPMENT USED



2.1 **TEST EQUIPMENT USED**

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Туре No.	Serial No	Calibration Period (months)	Calibration Due
PXA Signal Analyzer	Keysight	N9030A	MY53310519	12	2019-07-17

N/A – Not Applicable O/P Mon – Output Monitored with Calibrated Equipment



2.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30 MHz to 20 GHz Amplitude	± 0.1 dB
Conducted Emissions	30 MHz to 20 GHz Amplitude	± 2.3 dB
Frequency Stability	30 MHz to 2 GHz	± 5.0 Hz
Occupied Bandwidth	Up to 20 MHz Bandwidth	± 1.1 Hz
Band Edge	30 MHz to 20 GHz Amplitude	± 2.3 dB



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



3.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.

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