

CONFORMANCE TEST REPORT

FOR

Subpart E Part 24

Report No. : JNDL-NU-14R-0002

Client: Franklin Technology Inc.
Product: LTE/WIFI MOBILE ROUTER
Model: R774
Manufacture/supplier: Franklin Technology Inc.

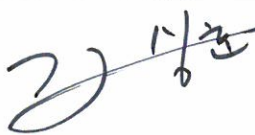
Date test item received: 2014/04/18
Date test campaign completed: 2014/05/29
Date of issue: 2014/06/02

ATTESTATION STATEMENT

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards.

All JNDL Laboratory. CO., LTD instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

Total number of pages of this test report : 40 pages

Test engineer	Report reviewed by
 2014.6.2	 2014.6.2
Sang-hun kang	Kyoung-Pil, Yeom

REPORT SUMMARY

Purpose of Test :	To demonstrate the EUT in compliance with Part 24 Subpart E of the FCC's
Disclaimer :	The test results relate only to the items tested.
Applicable Standards :	Part 24, Part 2, ANSI 63.4:2009, TIA-603-D-2010

TEST ENVIRONMENT AND TEST SETUP

Test Facilities :	Test Firm Registration # : 748649 3m & 10m Open Site : 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 3m semi-Anechoic chamber : B 114~115, 810 Kwanyang-Dong, dongan-Gu, Anyang-Si, Kyunggi-Do, 431-060, Korea
Laboratory Test Conditions :	Open Site : Temperature 25 °C, Humidity : 58 % 3m anechoic chamber : Temperature 26 °C, Humidity : 55 %
Test Exercise :	The EUT was set in continuous transmit mode of operation unless stated otherwise.
Modification to the EUT :	No modification was made.
Supporting Accessories :	None

REVISION HISTORY

Revision	Date	Descriptions
0	2014.06.02	Original release

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1. General Remarks

The test results in this report apply to the particular Equipment Under Test (EUT) as declared in this report.

The test results presented in this report relate only to the item tested.

2. Test Site

2.1 Location

JNDL Laboratory. CO., LTD. (Test Firm Registration # : 748649)

3m anechoic chamber : B 114~115, 810 Kwanyang-Dong, dongan-Gu, Anyang-Si, Kyunggi-Do, Korea

3m & 10m Open site : 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

2.2 List of Test equipment used for tests

No.	Instrument	Model No.	Due to Calibration	Manufactor	Serial No.
☒	PSA SPECTRUM ANALYZER (3 Hz ~ 26.5 GHz)	E4440A	2014-10-15	Agilent Technologies	MY46185375
☒	SPECTRUM ANALYZER (20 Hz ~ 40.0 GHz)	FSP40	2015-01-08	Rohde & Schwarz	100308
☒	SIGNAL GENERATOR (10 MHz ~ 40 GHz)	MG3694B	2014-10-15	Anritsu Corp	062513
☒	POWER METER (DC ~ 67 GHz)	NRP2	2014-10-15	Rohde & Schwarz	100973
☒	POWER SENSOR (50 MHz ~ 40 GHz)	NRP-Z85	2014-10-15	Rohde & Schwarz	101121
☒	POWER SENSOR (9 KHz ~ 6 GHz)	NRP-Z92	2014-10-15	Rohde & Schwarz	100093
☒	EMI TEST RECEIVER (20 MHz ~ 1000 MHz)	ESVS30	2014-10-15	Rohde & Schwarz	828525/005
☒	COMMUNICATION TEST SET (WCDMA/CDMA/EVDO/PCS)	E5515C	2014-07-31	Agilent Technologies	MY50260242
☐	COMMUNICATION TEST SET (LTE)	CMW500	2014-07-31	Rohde & Schwarz	140388
☒	POWER DIVIDER (DC-18GHz)	1506A	2014-10-15	WEINSCHTEL	KW957
☒	BILOG ANTENNA (30 MHz ~ 1000 MHz)	VULB 9168	2015-02-17	Schwarzbeck	9168-505
☐	DIPOLE ANTENNA (30 MHz ~ 1 GHz)	UHAP	2016-04-01	Schwarzbeck	950
☒	HORN ANTENNA (1 GHz ~ 18 GHz)	BBHA 9120D	2014-12-12	Schwarzbeck	568
☒	HORN ANTENNA (1 GHz ~ 18 GHz)	3117	2014-10-24	ETS-Lindgren	00135889
☒	Microwave Amplifier (1 GHz ~ 18 GHz)	TK-PA18	2014-09-05	TESTEK	1200020
☒	Low Noise Amplifier (18 GHz ~ 40 GHz)	AMF-6F-18004000-37-8P	2015-05-06	MITEQ	1814914
☒	High Power Amplifier (0.7 GHz ~ 2.5 GHz)	ZHL-30W-252-S+	N/A	Mini Circuit	804501219
☐	High Pass Filter (1.5 GHz ~ 15 GHz)	WHKX1.5/15G-6SS	2015-03-17	WAINWRIGHT	4
☒	High Pass Filter (3 GHz ~ 18 GHz)	WHK3.0/18G-10SS	2014-06-07	WAINWRIGHT	344

→ All equipment is calibrated with traceable calibrations.

2.3 Test Date

Date of Application: 2014- 04 - 18

Date of Test: 2014- 04 - 22 ~ 2014 - 05 - 29

3. Description of the Equipment Under Test

Manufacturer :	Franklin Technology Inc.
Product Description :	LTE/WIFI MOBILE ROUTER consists of LTE Band 12, LTE Band 25, Cellular CDMA, PCS CDMA, 1xRTT and EVDO Rev. 0 & Rev. A, WIFI(2.4 GHz)
FCC ID :	XHG-R774
Model Name :	R774
Multiple Model Name :	None
Operating Frequency :	TX : 1 851.25 MHz ~ 1 908.75 MHz RX : 1 931.25 MHz ~ 1 988.75 MHz
Modulation Type :	QPSK, 8PSK, 16QAM
Max. RF Output Power	• 0.552W EIRP PCS(27.42 dBm) • 0.552W EIRP PCS EVDO(27.18 dBm)
Emission Designator	• 1M29F9W PCS • 1M28F9W PCS EVDO
EUT Power Source :	Primary power – 3.7 Vdc Battery
	Secondary Power – Via AC Mains Powered DC 5V adapter
Test Item :	Prototype
Type of Equipment :	Mobile
Antennas :	PIFA Internal Antenna Max peak gain : -0.4 dBi
Antenna Connector :	DIP Connection(INTENNA)

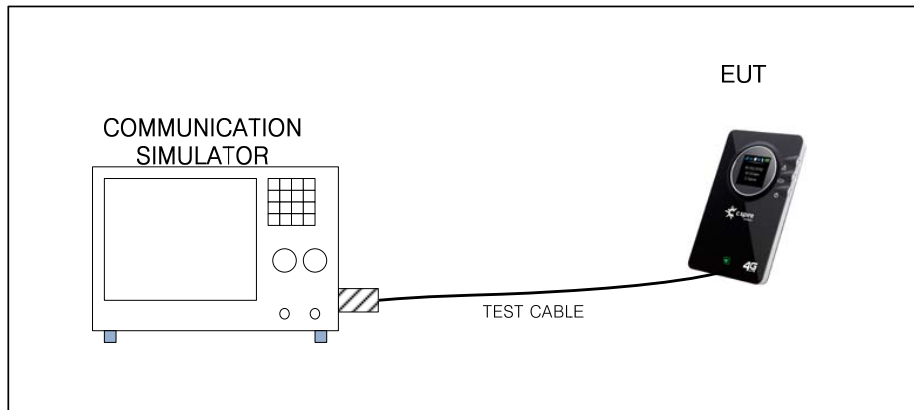
➔ All the testing were performed according to the procedures in FCC Parts 24 & Parts 2
The EUT was operation with Communication Simulator (E5515C)

4. List of Measurements

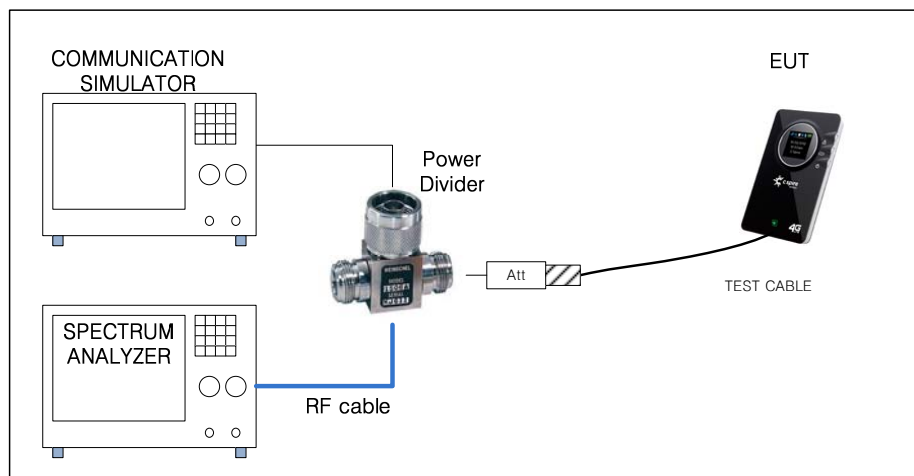
Guide Lines	FCC Rules Part	Test Conditon	Result
Conducted Output Power	2.1046	Conducted	PASS
Equivalent Isotropically Radiated Power	24.232	Radiated	PASS
Peak to Average Ratio	24.232(d)	Conducted	PASS
Modulation Characteristics	2.1047	Conducted	PASS
Occupied Bandwidth	24.238(a) / 2.1049	Conducted	PASS
Band Edges Compliance	24.238(b) / 2.1051	Conducted	PASS
Spurious Emission at Antenna Terminals	24.238(a) / 2.1051	Conducted	PASS
Field Strength of Spurious Radiation	24.238(a) / 2.1053	Radiated	PASS
Frequency Stability	24.235 / 2.1055	Conducted	PASS

5. Description of Tests

5.1 Conducted power / Modulation Characteristics



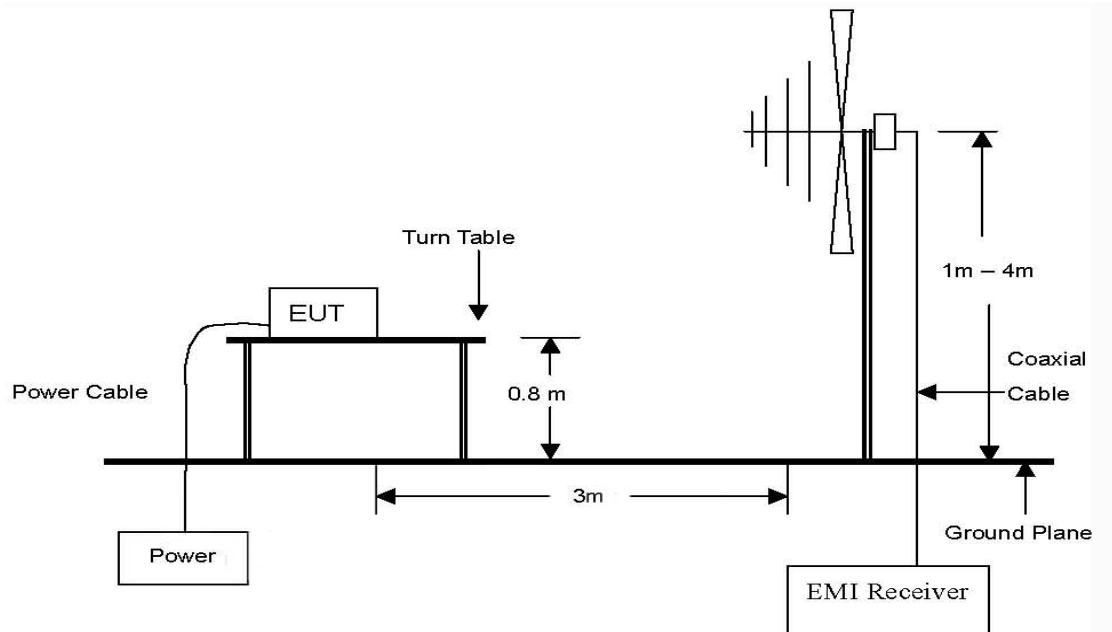
5.2 Peak to Average Ratio / Occupied Bandwidth / Band Edges Compliance / Spurious Emission at Antenna Terminals



5.3 Equivalent Isotropically Radiated Power / Field Strength of Spurious radiation

5.3.1 Test setup for 30 MHz ~ 1 GHz

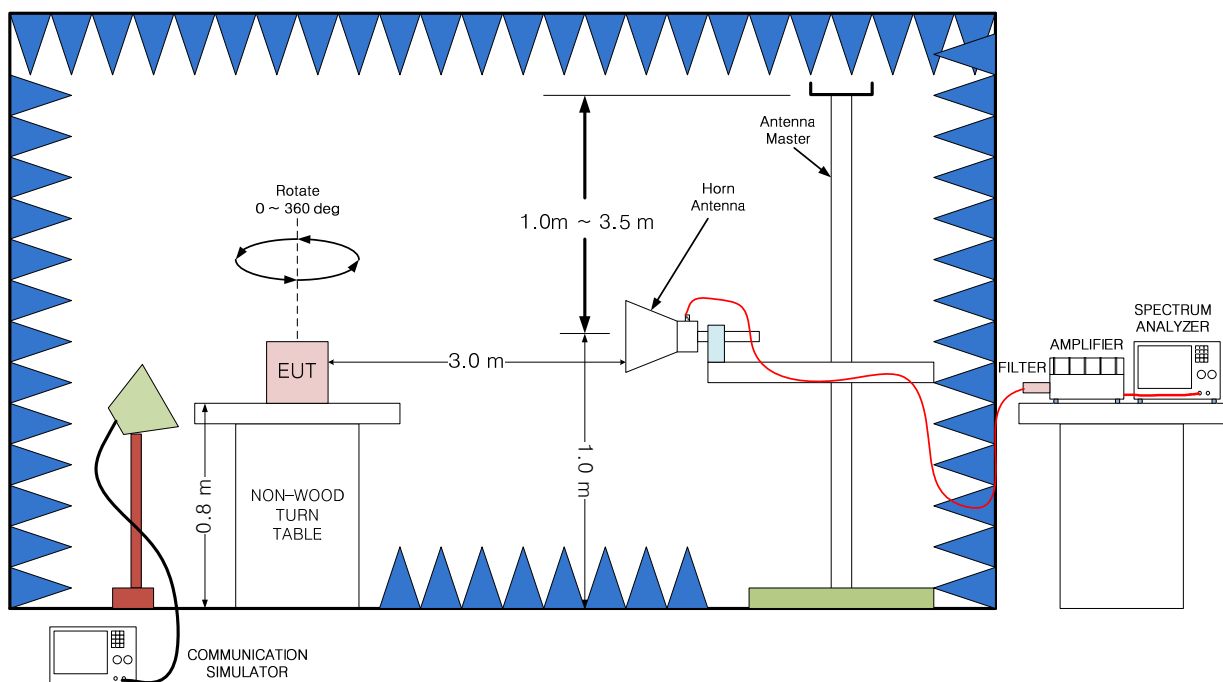
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions



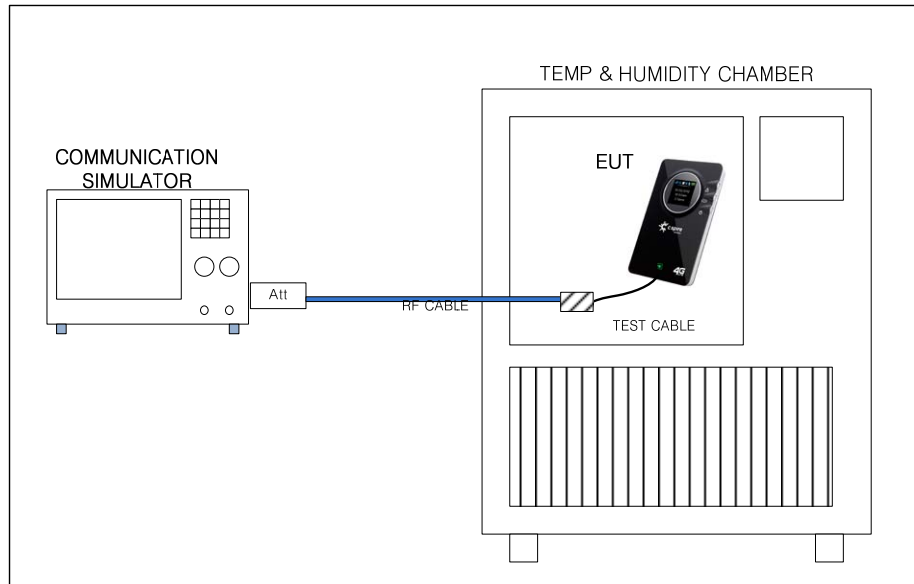
5.3.2 Test setup for 1 GHz ~ 20 GHz

The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 20 GHz emissions. As required by subpart 15.33 emissions were measured to 20 GHz.(10th carrier frequency)

*** EIRP measurement not use filter, it only use Field Strength of Spurious emissions.**



5.4 Frequency Stability



5.5 Worst-case Configuration and mode

Radiated emission and conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations XY,YZ,ZX.

Based on the baseline scan, the worst-case were:

PCS : RC1/SO55

PCS EVDO : Rev.0 FTAP 1228.8 k

5.6 EUT operating conditions

The Eut makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmittision mode and specific channel frequency.

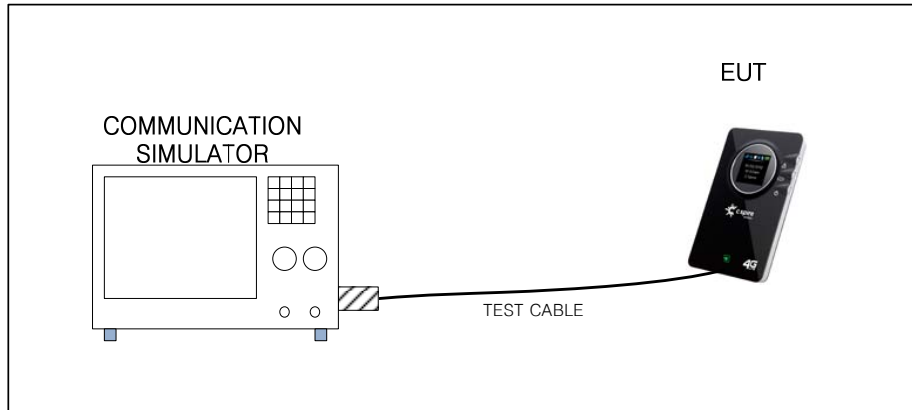
5.7 Methods and Procedure

Reference :	47 FCC PART 24 subpart E
Title :	BROADBAND PCS
Reference :	47 FCC PART 2
Title :	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
Reference :	ANSI / TIA-603-D-2010
Title :	Land mobile fm or pm communications equipment measurement and performance standards
Reference :	FCC KDB 971168 D01 v02r01, 7 June 2013
Title:	Measurement Guidance for Certification of Licensed Digital Transmitters

6. Conducted Output power

6.1 Test Procedure

A base station simulator was used to establish communication with The EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



* Simulator call mode : all bit up,

* TEST Cable : Connect PCS Antenna PORT (0.6dB loss / 30 cm / MCX to SMA Cable)

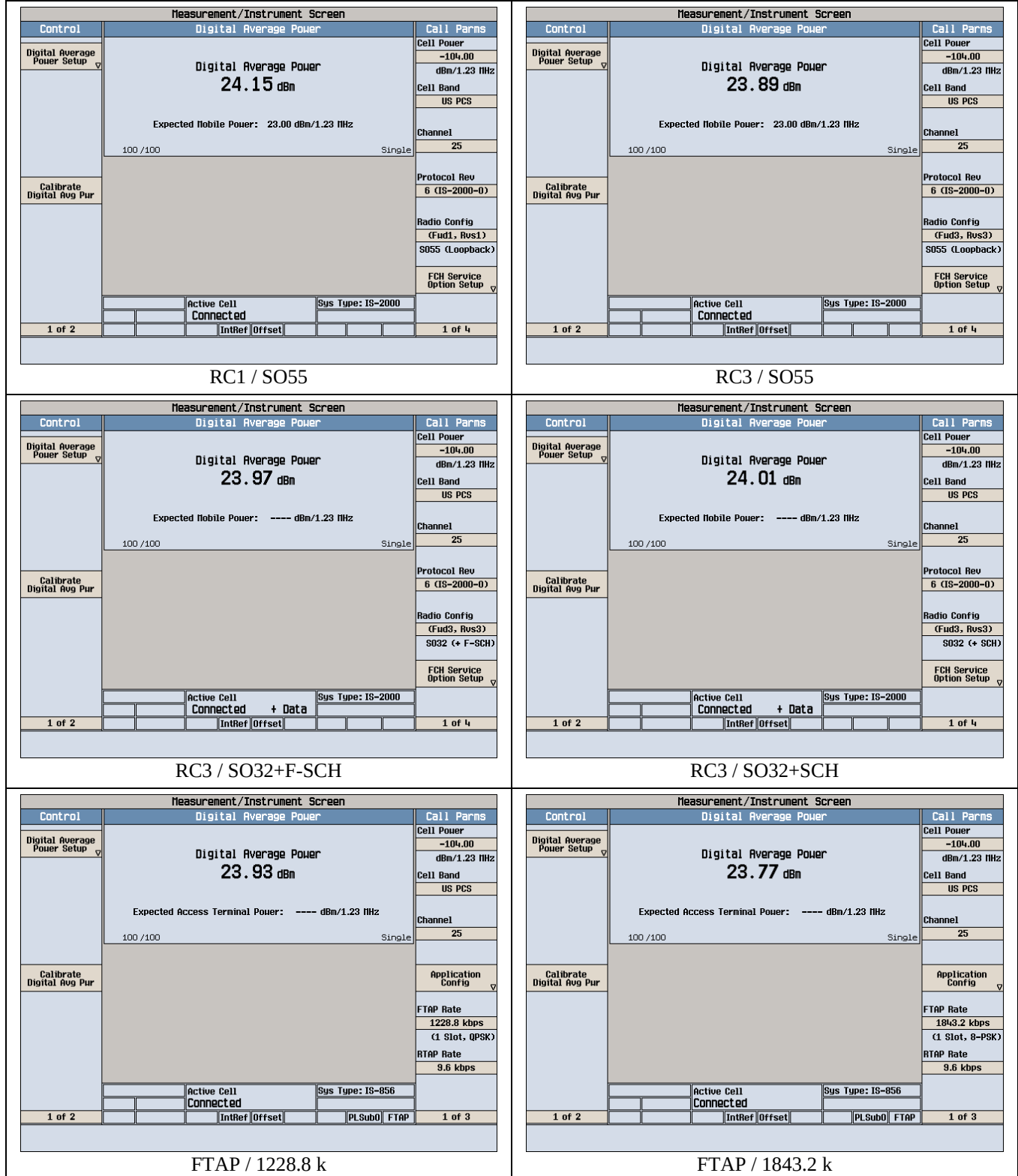
6.2 Test Result

Unit : dBm

Mode	Radio Config	FCH Svc opt.	Low ch : 25	Mid ch : 600	High ch : 1175
			Freq(MHz) : 1 851.25	Freq(MHz) : 1 880.00	Freq(MHz) : 1 908.75
PCS	1	SO55	24.15	23.74	23.76
	3	SO55	23.89	23.70	23.69
	3	SO32+F-SCH	23.97	23.78	23.61
	3	SO32+SCH	24.01	23.83	23.56
PCS EDVO Rev. 0	FTAP	1228.8 k	23.93	23.47	23.56
	FTAP	1843.2 k	23.77	23.52	23.54
	FTAP	2457.6 k	23.81	23.68	23.57
	RTAP	153.6 k	23.79	23.52	23.58
PCS EDVO Rev. A	FETAP	1228.8 k	22.87	22.65	22.75
	FETAP	1843.2 k	22.81	22.62	22.80
	FETAP	3072 k	22.88	22.92	22.81
	RETAP	4096 b	22.95	22.86	22.88

6.3 Test Plots

* CH:25 (1 851.25 MHz)



* CH:25 (1 851.25 MHz)

Measurement/Instrument Screen Digital Average Power Digital Average Power 23.81 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 9.6 kbps Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub0 FTAP 1 of 3
FTAP / 2457.6 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 23.79 dBm Expected Access Terminal Power: 23.00 dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 153.6 kbps Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub0 RTAP 1 of 3
RTAP / 153.6 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.87 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config F-Traffic Format 9 (2048,1.64) (1228.8k, QPSK) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub2 FETAP 1 of 3
FETAP / 1228.8 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.81 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config F-Traffic Format B (3072,1.64) (1843.2k, 8-PSK) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub2 FETAP 1 of 3
FETAP / 1843.2 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.88 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub2 FETAP 1 of 3
FETAP / 3072 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.95 dBm Expected AT Power (Pre-Trans): 23.00 dBm/1.23 MHz Expected AT Power (Post-Trans): 23.00 dBm/1.23 MHz 100 /100 Single				Call Params Cell Power ~104.00 dBm/1.23 MHz Cell Band US PCS Channel 25 Application Config F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 IntRef Offset PLSub2 RETAP 1 of 3
RETAP / 4096 b				

* CH:600 (1 880.00 MHz)

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.74 dBm Expected Mobile Power: 23.00 dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Protocol Rev	6 (IS-2000-0)
Calibrate Digital Avg Pur		Radio Config	(Fud1, Rvs1)
		S055 (Loopback)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC1 / SO55

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.70 dBm Expected Mobile Power: 23.00 dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Protocol Rev	6 (IS-2000-0)
Calibrate Digital Avg Pur		Radio Config	(Fud3, Rvs3)
		S055 (Loopback)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO55

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.78 dBm Expected Mobile Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Protocol Rev	6 (IS-2000-0)
Calibrate Digital Avg Pur		Radio Config	(Fud3, Rvs3)
		S032 (+ F-SCH)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected + Data	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO32+F-SCH

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.83 dBm Expected Mobile Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Protocol Rev	6 (IS-2000-0)
Calibrate Digital Avg Pur		Radio Config	(Fud3, Rvs3)
		S032 (+ SCH)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected + Data	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO32+SCH

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.47 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Application Config ▾	
Calibrate Digital Avg Pur		FTAP Rate	1228.8 kbps
		(1 Slot, QPSK)	
		RTAP Rate	9.6 kbps
1 of 2	Active Cell Connected	Sys Type: IS-856	1 of 3
	IntRef Offset	PLSub0 FTAP	

FTAP / 1228.8 k

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.52 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		Cell Band	US PCS
		Channel	600
		Application Config ▾	
Calibrate Digital Avg Pur		FTAP Rate	1843.2 kbps
		(1 Slot, 8-PSK)	
		RTAP Rate	9.6 kbps
1 of 2	Active Cell Connected	Sys Type: IS-856	1 of 3
	IntRef Offset	PLSub0 FTAP	

FTAP / 1843.2 k

* CH:600 (1 880.00 MHz)

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 23.68 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 9.6 kbps				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub0		FTAP 1 of 3	

FTAP / 2457.6 k

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 23.52 dBm Expected Access Terminal Power: 23.00 dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 153.6 kbps				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub0		RTAP 1 of 3	

RTAP / 153.6 k

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 22.65 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							F-Traffic Format 9 (2048,1.64) (1228.8k, QPSK) R-Data Pkt Size 4096 bits				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub2		FETAP 1 of 3	

FETAP / 1228.8 k

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 22.62 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							F-Traffic Format B (3072,1.64) (1843.2k, 8-PSK) R-Data Pkt Size 4096 bits				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub2		FETAP 1 of 3	

FETAP / 1843.2 k

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 22.92 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub2		FETAP 1 of 3	

FETAP / 3072 k

Measurement/Instrument Screen											
Control		Digital Average Power					Call Pams				
Digital Average Power Setup ▾		Digital Average Power 22.86 dBm Expected AT Power (Pre-Trans): 23.00 dBm/1.23 MHz Expected AT Power (Post-Trans): 23.00 dBm/1.23 MHz 100 /100 Single					Cell Power -104.00 dBm/1.23 MHz				
Calibrate Digital Avg Pur							Cell Band US PCS				
							Channel 600				
							Application Config ▾				
							F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits				
		Active Cell Connected					Sys Type: IS-856				
1 of 2				IntRef Offset				PLSub2		RETAP 1 of 3	

RETAP / 4096 b

* CH:1175 (1 908.75 MHz)

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.76 dBm Expected Mobile Power: 23.00 dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Protocol Rev	6 (IS-2000-0)
		Radio Config	(Fud1, Rvs1)
		S055 (Loopback)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC1 / SO55

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.69 dBm Expected Mobile Power: 23.00 dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Protocol Rev	6 (IS-2000-0)
		Radio Config	(Fud3, Rvs3)
		S055 (Loopback)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO55

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.61 dBm Expected Mobile Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Protocol Rev	6 (IS-2000-0)
		Radio Config	(Fud3, Rvs3)
		S032 (+ F-SCH)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected + Data	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO32+F-SCH

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.58 dBm Expected Mobile Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Protocol Rev	6 (IS-2000-0)
		Radio Config	(Fud3, Rvs3)
		S032 (+ SCH)	
		FCH Service Option Setup ▾	
1 of 2	Active Cell Connected + Data	Sys Type: IS-2000	1 of 4
	IntRef Offset		

RC3 / SO32+SCH

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.56 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Application Config ▾	
		FTAP Rate	1228.8 kbps
		(1 Slot, QPSK)	
		RTAP Rate	9.6 kbps
1 of 2	Active Cell Connected	Sys Type: IS-856	1 of 3
	IntRef Offset	PLSub0 FTAP	

FTAP / 1228.8 k

Measurement/Instrument Screen			
Control	Digital Average Power	Cell Params	
Digital Average Power Setup ▾	Digital Average Power 23.54 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 / 100 Single	Cell Power	-104.00
		dBm/1.23 MHz	
		Cell Band	US PCS
		Channel	1175
Calibrate Digital Avg Pur		Application Config ▾	
		FTAP Rate	1843.2 kbps
		(1 Slot, 8-PSK)	
		RTAP Rate	9.6 kbps
1 of 2	Active Cell Connected	Sys Type: IS-856	1 of 3
	IntRef Offset	PLSub0 FTAP	

FTAP / 1843.2 k

* CH:1175 (1 908.75 MHz)

Measurement/Instrument Screen Digital Average Power Digital Average Power 23.57 dBm Expected Access Terminal Power: ---- dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 9.6 kbps Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
FTAP / 2457.6 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 23.58 dBm Expected Access Terminal Power: 23.00 dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config FTAP Rate 2457.6 kbps (1 Slot, 16-QAM) RTAP Rate 153.6 kbps Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
RTAP / 153.6 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.75 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config F-Traffic Format 9 (2048,1.64) (1228.8k, QPSK) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
FETAP / 1228.8 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.80 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config F-Traffic Format B (3072,1.64) (1843.2k, 8-PSK) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
FETAP / 1843.2 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.81 dBm Expected AT Power (Pre-Trans): ---- dBm/1.23 MHz Expected AT Power (Post-Trans): ---- dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
FETAP / 3072 k				
Measurement/Instrument Screen Digital Average Power Digital Average Power 22.88 dBm Expected AT Power (Pre-Trans): 23.00 dBm/1.23 MHz Expected AT Power (Post-Trans): 23.00 dBm/1.23 MHz 100 /100 Single				Cell Power -104.00 dBm/1.23 MHz Cell Band US PCS Channel 1175 Application Config F-Traffic Format E (5120,1.64) (3072.0k,16-QAM) R-Data Pkt Size 4096 bits Active Cell Connected Sys Type: IS-856 1 of 2 1 of 3
RETAP / 4096 b				

7. Equivalent Isotropically Radiated power

7.1 Test Procedure

- All measurements were done at low, middle and high operational frequency range. RBW and VBW is 3MHz for PCS mode.
- Substitution method is used for EIRP measurement. In the open-site chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- The substitution Horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution Horn}$

* This device was tested under all configurations and the highest power is reported. Also, we have done XY, YZ, ZX planes in EUT and horizontal and vertical polarization in detecting antenna.

* The worst case of PCS mode is

PCS : RC1/SO55

PCS EVDO : Rev.0 FTAP 1228.8 k

* Configuration : refer to 5.3 chapter.

* Simulator call mode : all bit up

7.2 Test Result

Mode	Radio Config	FCH Svc opt.	Low ch : 25	Mid ch : 600	High ch : 1175
			Freq(MHz) : 1 851.25	Freq(MHz) : 1 880.00	Freq(MHz) : 1 908.75
PCS	1	SO55	0.369 W (25.67 dBm)	0.345 W (25.37 dBm)	0.552 W (27.42 dBm)
PCS EVDO Rev. 0	FTAP	1228.8 k	0.330 W (25.18 dBm)	0.357 W (25.53 dBm)	0.552 W (27.18 dBm)

7.3 Test Criteria

The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

7.3 Test Result

7.3.1 XY SCAN

MODE	CH /FREQ		Polar	SCAN	Measured Level	Measured Level	Substitute Level	ANT Gain	Cable Loss	EIRP	
	CHANNEL	FREQ (MHz)	Hor/Ver	X,Y,Z	(dBuV)	(dBm)	(dBm)	(dB)	(dB)	W	dBm
RC1 / SO55	25	1851.25	V	XY	87.00	-20.00	19.53	5.76	2.88	0.174	22.42
	600	1880.00		XY	87.38	-19.62	19.83	5.76	3.01	0.181	22.58
	1175	1908.75		XY	87.96	-19.04	21.67	5.75	2.91	0.283	24.51
RC1 / SO55	25	1851.25	H	XY	82.64	-24.36	15.32	5.76	2.88	0.066	18.21
	600	1880.00		XY	82.40	-24.60	15.20	5.76	3.01	0.062	17.95
	1175	1908.75		XY	84.51	-22.49	17.32	5.75	2.91	0.104	20.16
FTAP / 1228.8K	25	1851.25	V	XY	86.78	-20.22	19.31	5.76	2.88	0.166	22.20
	600	1880.00		XY	87.37	-19.63	19.82	5.76	3.01	0.181	22.57
	1175	1908.75		XY	87.90	-19.10	21.61	5.75	2.91	0.279	24.45
FTAP / 1228.8K	25	1851.25	H	XY	82.23	-24.77	14.91	5.76	2.88	0.060	17.80
	600	1880.00		XY	82.43	-24.57	15.23	5.76	3.01	0.063	17.98
	1175	1908.75		XY	84.43	-22.57	17.24	5.75	2.91	0.102	20.08

7.3.2 YZ SCAN

MODE	CH /FREQ		Polar	SCAN	Measured Level	Measured Level	Substitute Level	ANT Gain	Cable Loss	EIRP	
	CHANNEL	FREQ (MHz)	Hor/Ver	X,Y,Z	(dBuV)	(dBm)	(dBm)	(dB)	(dB)	W	dBm
RC1 / SO55	25	1851.25	V	YZ	82.15	-24.85	14.68	5.76	2.88	0.057	17.57
	600	1880.00		YZ	80.90	-26.10	13.35	5.76	3.01	0.041	16.10
	1175	1908.75		YZ	86.55	-20.45	20.26	5.75	2.91	0.204	23.10
RC1 / SO55	25	1851.25	H	YZ	87.96	-19.04	20.64	5.76	2.88	0.225	23.53
	600	1880.00		YZ	89.31	-17.69	22.11	5.76	3.01	0.306	24.86
	1175	1908.75		YZ	89.36	-17.64	22.17	5.75	2.91	0.317	25.01
FTAP / 1228.8K	25	1851.25	V	YZ	81.69	-25.31	14.22	5.76	2.88	0.051	17.11
	600	1880.00		YZ	80.65	-26.35	13.10	5.76	3.01	0.038	15.85
	1175	1908.75		YZ	86.15	-20.85	19.86	5.75	2.91	0.186	22.70
FTAP / 1228.8K	25	1851.25	H	YZ	87.45	-19.55	20.13	5.76	2.88	0.200	23.02
	600	1880.00		YZ	88.94	-18.06	21.74	5.76	3.01	0.281	24.49
	1175	1908.75		YZ	89.22	-17.78	22.03	5.75	2.91	0.307	24.87

7.3.3 ZX SCAN

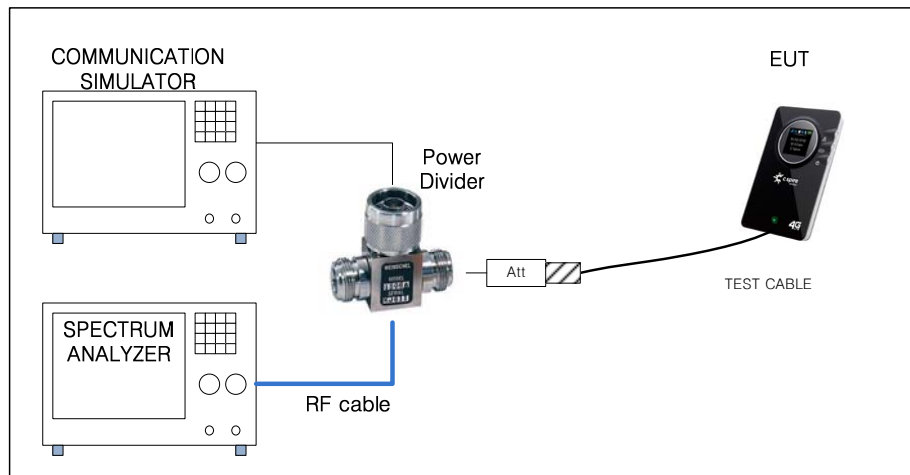
MODE	CH /FREQ		Polar	SCAN	Measured Level	Measured Level	Substitute Level	ANT Gain	Cable Loss	EIRP	
	CHANNEL	FREQ (MHz)	Hor/Ver	X,Y,Z	(dBuV)	(dBm)	(dBm)	(dB)	(dB)	W	dBm
RC1 / SO55	25	1851.25	V	ZX	86.20	-20.80	18.73	5.76	2.88	0.145	21.62
	600	1880.00		ZX	86.34	-20.66	18.79	5.76	3.01	0.143	21.54
	1175	1908.75		ZX	88.70	-18.30	22.41	5.75	2.91	0.335	25.25
RC1 / SO55	25	1851.25	H	ZX	90.10	-16.90	22.78	5.76	2.88	0.369	25.67
	600	1880.00		ZX	89.82	-17.18	22.62	5.76	3.01	0.345	25.37
	1175	1908.75		ZX	91.77	-15.23	24.58	5.75	2.91	0.552	27.42
FTAP / 1228.8K	25	1851.25	V	ZX	85.93	-21.07	18.46	5.76	2.88	0.136	21.35
	600	1880.00		ZX	86.34	-20.66	18.79	5.76	3.01	0.143	21.54
	1175	1908.75		ZX	88.89	-18.11	22.60	5.75	2.91	0.350	25.44
FTAP / 1228.8K	25	1851.25	H	ZX	89.61	-17.39	22.29	5.76	2.88	0.330	25.18
	600	1880.00		ZX	89.98	-17.02	22.78	5.76	3.01	0.357	25.53
	1175	1908.75		ZX	91.53	-15.47	24.34	5.75	2.91	0.522	27.18

8. Peak to Average Ratio

8.1 Test Procedure

A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth
- Set the number of counts to a value that stabilizes the measured CCDF curve



* Simulator call mode : all bit up

* TEST Cable : Connect PCS Antenna PORT (0.6dB loss / 30 cm / MCX to SMA Cable)

* RF Cable : HUBER+SHUNER / SUCOFLEX 104 / DC-18 GHz / 1.0 m

* Attenuator : 10 dB (Weinshel /56-10/ DC-28 GHz) + 10 dB(Weinshel / 56-10 / DC-28 GHz)

* Power Divider : WEINSCHEL / 1506A / DC-18 GHz / 3 Port

* Path Loss Information

Frequency (MHz)	RF Cable (dB)	10 dB ATT (dB)	10 dB ATT (dB)	Power Diver (dB)	Test Cable (dB)	Total Loss (dB)
1 880.00	0.45	9.62	9.61	5.78	0.60	26.06

8.2 Test Result

Unit : dB

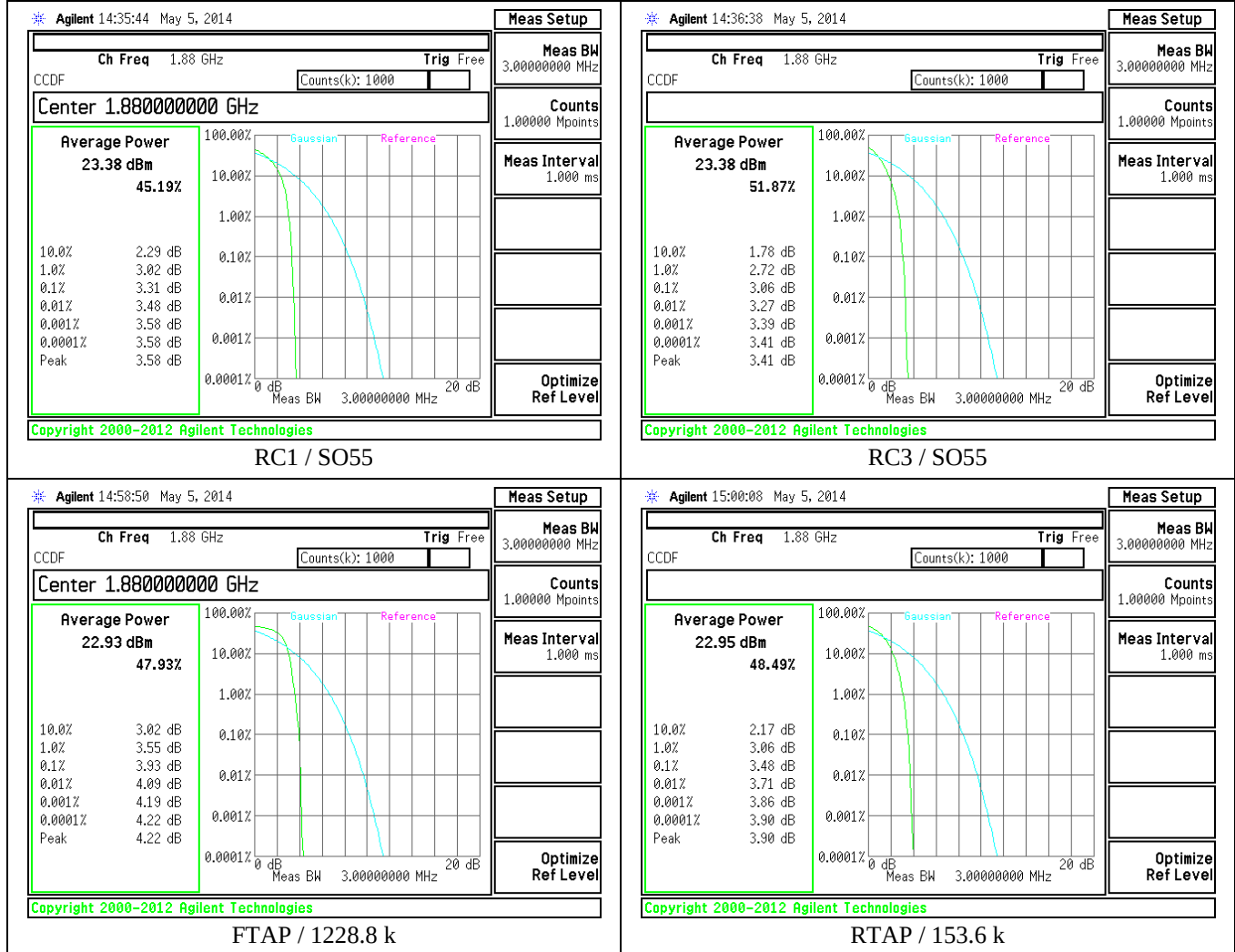
Mode	Radio Config	FCH Svc opt.	Low ch : 25	Mid ch : 600	High ch : 1175
			Freq(MHz) : 1 851.25	Freq(MHz) : 1 880.00	Freq(MHz) : 1 908.75
PCS	1	SO55	-	3.31	-
	3	SO55	-	3.06	-
PCS EDVO Rev. 0	FTAP	1228.8 k	-	3.93	-
	RTAP	153.6 k	-	3.48	-

8.3 Test Criteria

In measuring transmissions in this band using an average power technique, the peak to average ratio of the transmission may not exceed 13 dB (associated with a probability of 0.1%)

8.4 Test Plots

* CH:600 (1 880.00 MHz)



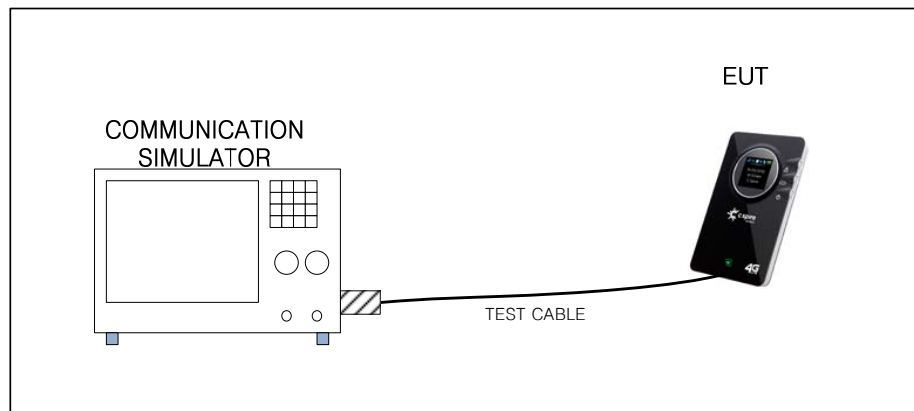
9. Modulation Characteristics

9.1 Definition

Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

9.2 Test Procedure

The measurement frequency is center channel(600)

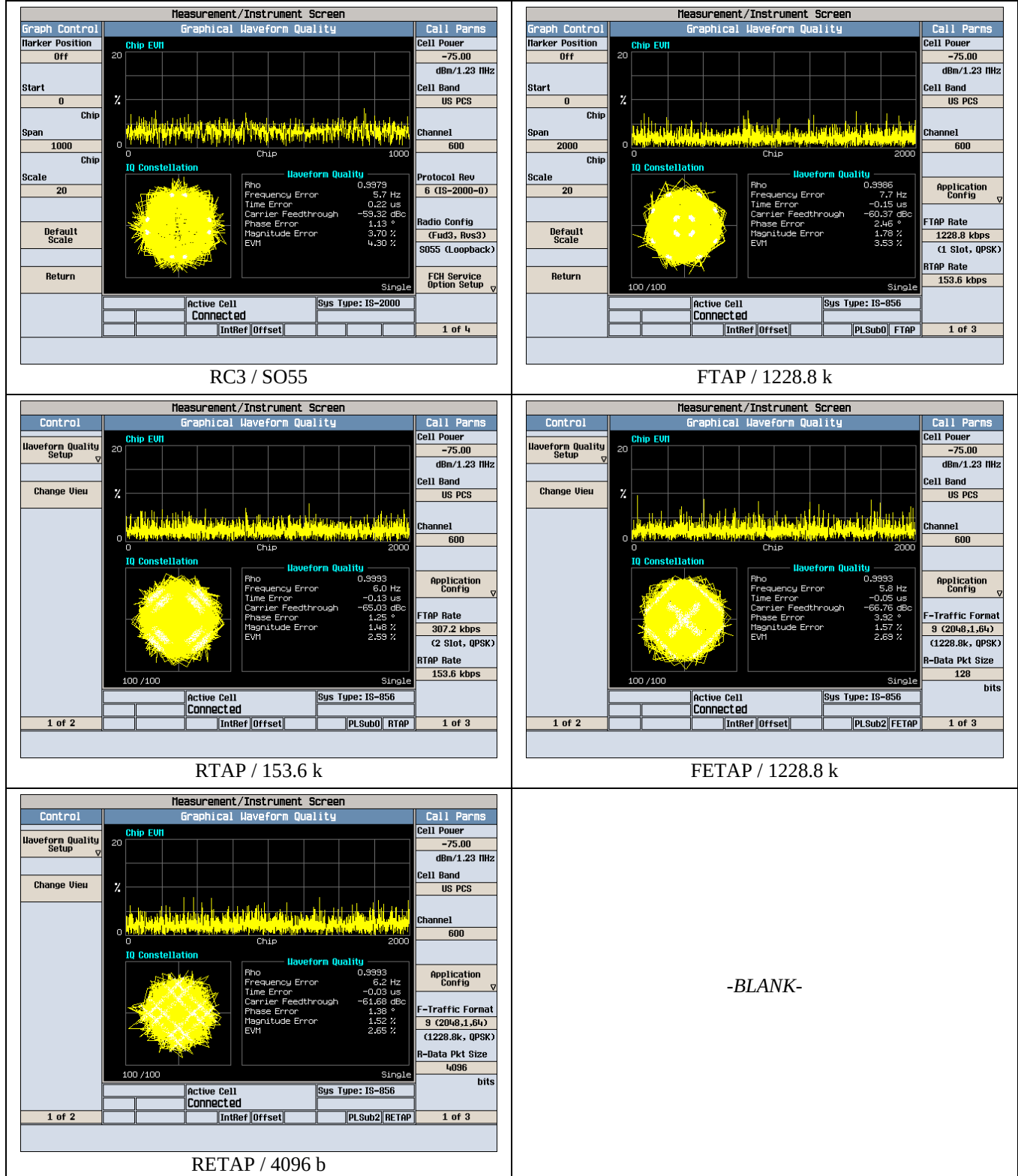


9.3 Test Criteria

The waveform quality factor shall be greater than 0.944

9.4 Test Plots

* CH:600 (1 880.00 MHz)



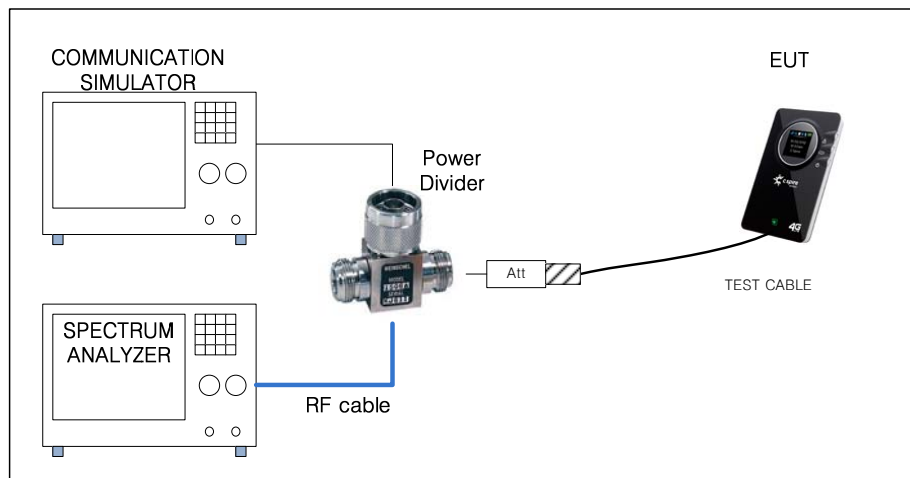
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10. Occupied Bandwidth

10.1 Definition

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

10.2 Test Procedure



* Simulator call mode : all bit up

* TEST Cable : Connect PCS Antenna PORT (0.6dB loss / 30 cm / MCX to SMA Cable)

* RF Cable : HUBER+SHUNER / SUCOFLEX 104 / DC-18 GHz / 1.0 m

* Attenuator : 10 dB (Weinshel /56-10/ DC-28 GHz) + 10 dB(Weinshel / 56-10 / DC-28 GHz)

* Power Divider : WEINSCHEL / 1506A / DC-18 GHz / 3 Port

* Path Loss Information

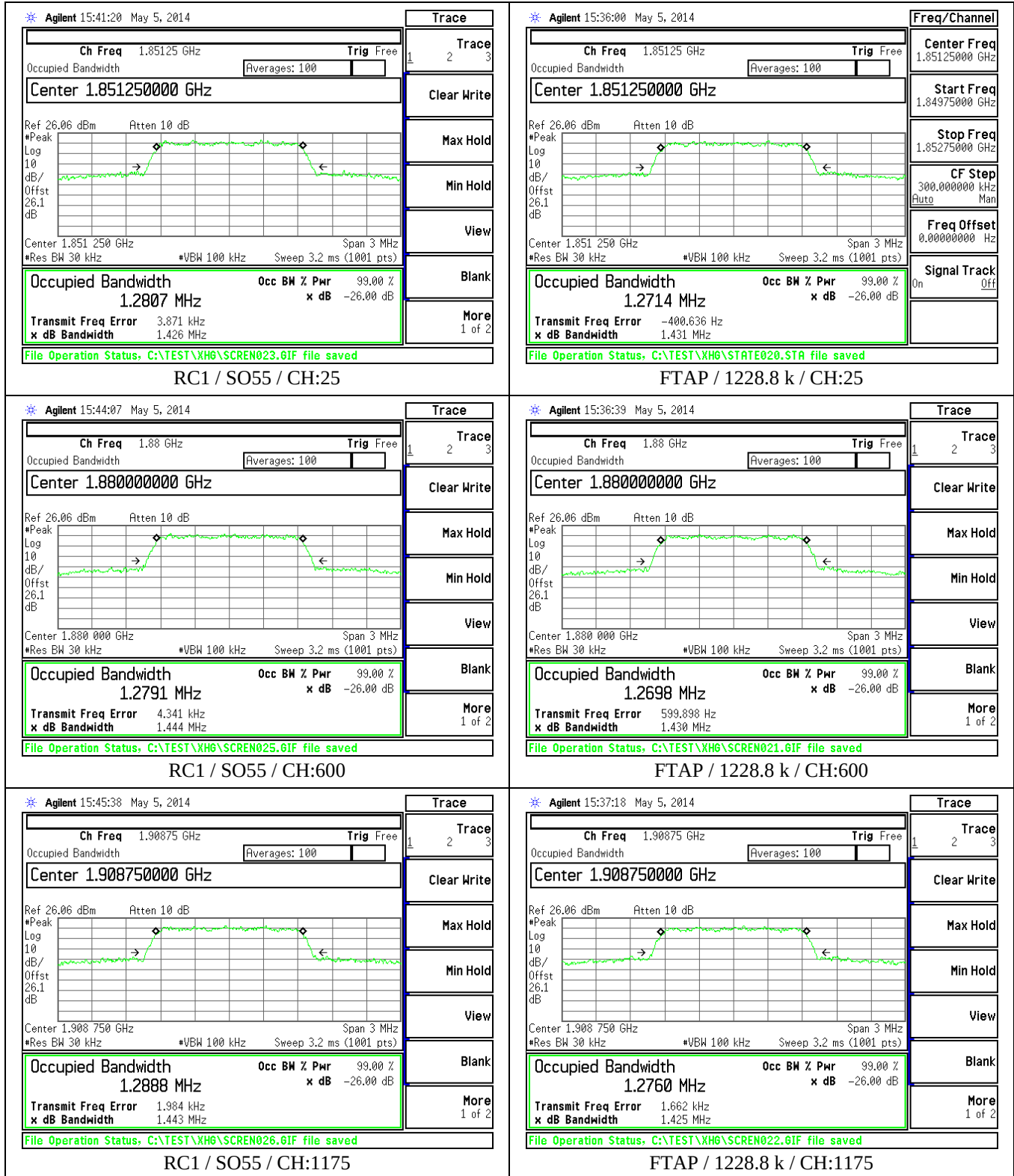
Frequency (MHz)	RF Cable (dB)	10 dB ATT (dB)	10 dB ATT (dB)	Power Diver (dB)	Test Cable (dB)	Total Loss (dB)
1 880.00	0.45	9.62	9.61	5.78	0.60	26.06

10.3 Test Result

Unit : MHz

Mode	Radio Config	FCH Svc opt.	Low ch : 25	Mid ch : 600	High ch : 1175
			Freq(MHz) : 1 851.25	Freq(MHz) : 1 880.00	Freq(MHz) : 1 908.75
PCS	1	SO55	1.281	1.279	1.289
PCS EDVO Rev. 0	FTAP	1228.8 k	1.271	1.270	1.276

10.4 Test Plots



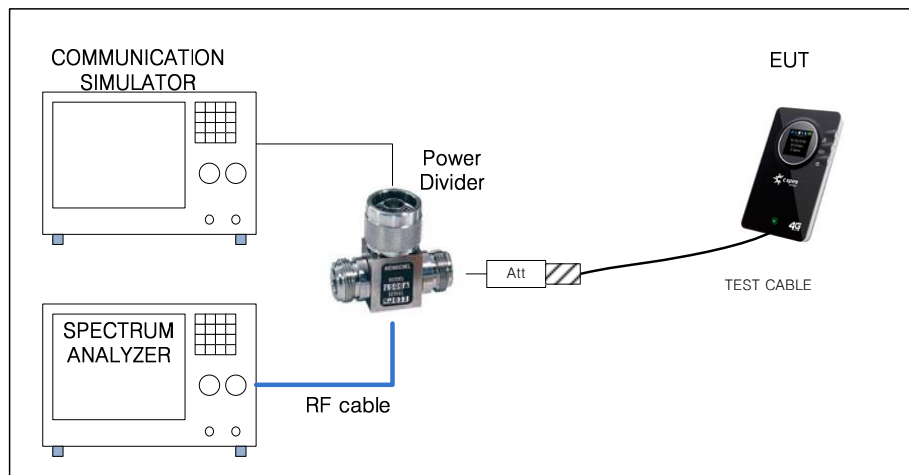
11. Band Edge Compliance

11.1 Definition

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission limit equal to -13dBm .

11.2 Test Procedure

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1MHz. The RBW of the spectrum is 13kHz and the VBW of the spectrum is 51kHz.
- Record the max trace plot into the test report.
- The center frequency of spectrum is the band edge frequency ± 3 MHz, span is 4 MHz. The RBW is 1 MHz, and the VBW is 3 MHz
- Record the max trace plot into the test report.



* Simulator call mode : all bit up

* TEST Cable : Connect CDMA Antenna PORT (0.6dB loss / 30 cm / MCX to SMA Cable)

* RF Cable : HUBER+SHUNER / SUCOFLEX 104 / DC-18 GHz / 1.0 m

* Attenuator : 10 dB (Weinshel / 56-10/ DC-28 GHz) + 10 dB(Weinshel / 56-10 / DC-28 GHz)

* Power Divider : WEINSCHTEL / 1506A / DC-18 GHz / 3 Port

* Path Loss Information

Frequency (MHz)	RF Cable (dB)	10 dB ATT (dB)	10 dB ATT (dB)	Power Diver (dB)	Test Cable (dB)	Total Loss (dB)
1 880.00	0.45	9.62	9.61	5.78	0.60	26.06

11.3 Test Criteria

At least -13 dBm below.

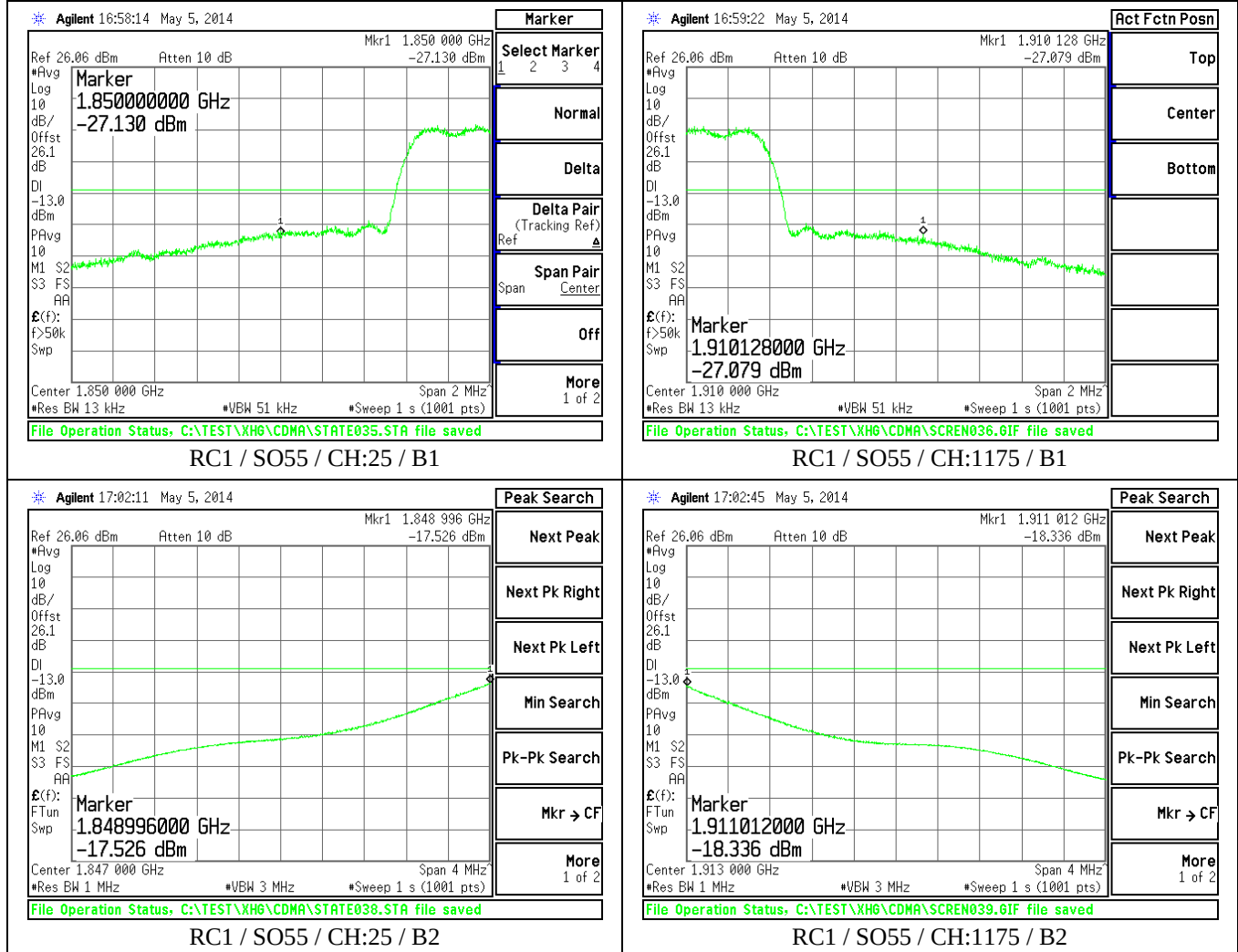
11.4 Test Result

Unit :dBm

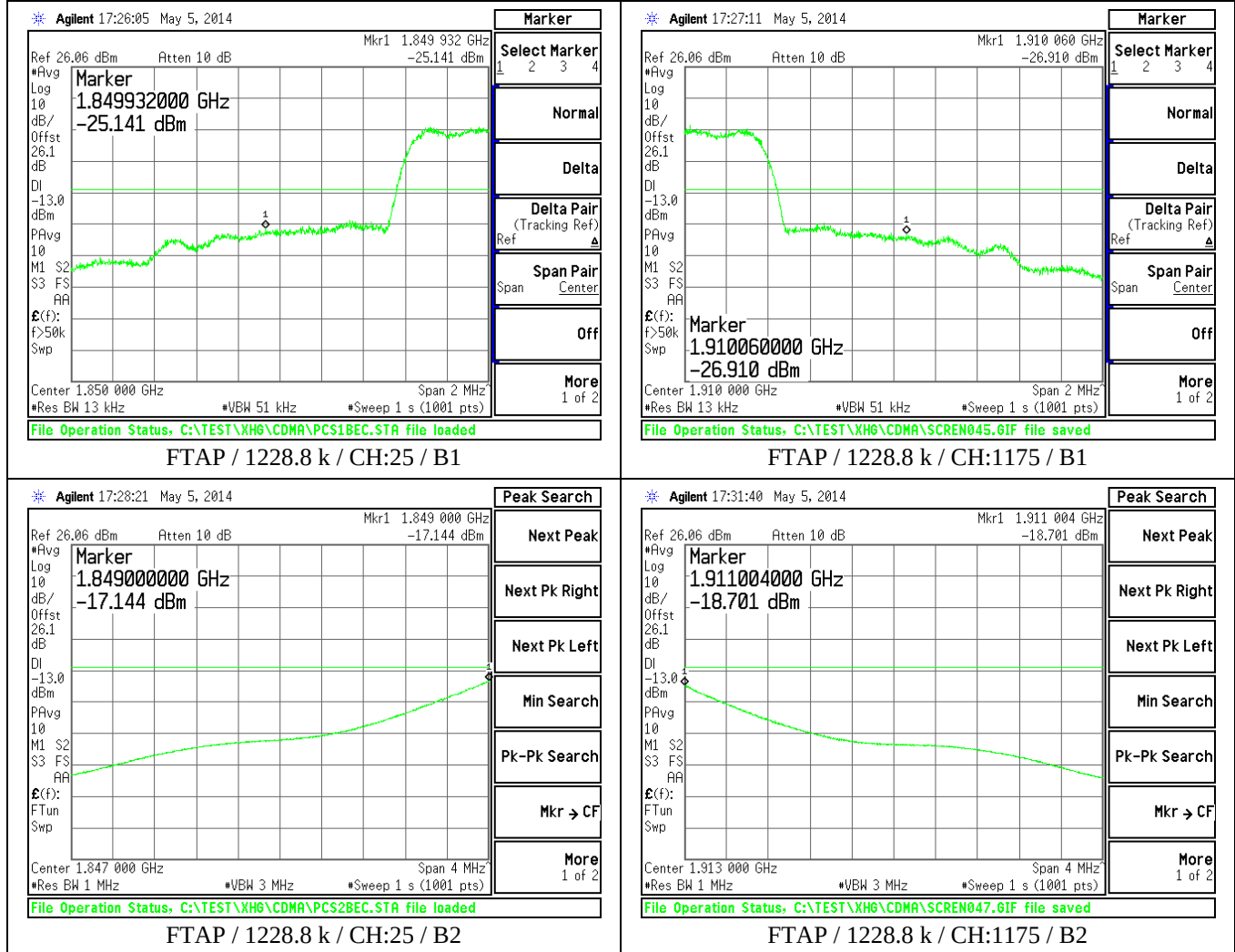
Mode	Radio Config	FCH Svc opt.	Low ch : 25	RBW / VBW / SPAN	High ch : 1175
			Freq(MHz) : 1 851.25		Freq(MHz) : 1 908.75
PCS	CENTER FREQUENCY(B1)		1 850 MHz	-	1 910 MHz
	1	SO55	-27.13	13K / 51K / 2M	-27.08
	CENTER FREQUENCY(B2)		1 847 MHz	-	1 913 MHz
	1	SO55	-17.53	1M /3M /4M	-18.34
PCS EVDO Rev. 0	CENTER FREQUENCY(B1)		1 850 MHz	-	1 910 MHz
	FTAP	1228.8 k	-25.14	13K / 51K / 2M	-26.91
	CENTER FREQUENCY(B2)		1 847 MHz	-	1 913 MHz
	FTAP	1228.8 k	-17.14	1M /3M /4M	-18.70

11.5 Test Plots

* PCS



* PCS EVDO Rev. 0



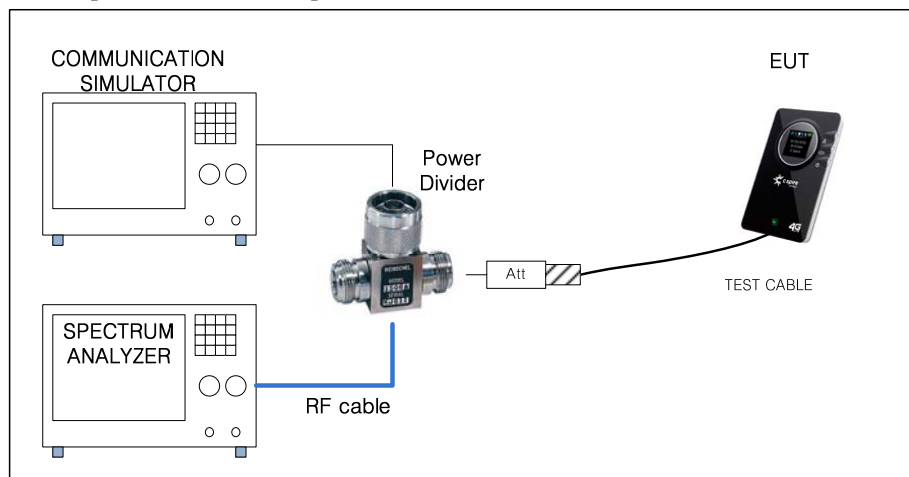
12. Spurious Emission at Antenna Terminals

12.1 Definition

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm .

12.2 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at middle frequency range.
- Measuring frequency range is from 30 MHz to 20GHz. The RBW=1MHz and VBW=3MHz is used for conducted emission measurement.(correct frequency attenuation level)
- Record the max trace plot into the test report.



* Simulator call mode : all bit up

* TEST Cable : Connect CDMA Antenna PORT (0.6dB loss / 30 cm / MCX to SMA Cable)

* RF Cable : HUBER+SHUNER / SUCOFLEX 104 / DC-18 GHz / 1.0 m

* Attenuator : 10 dB (Weinshel /56-10/ DC-28 GHz) + 10 dB(Weinshel / 56-10 / DC-28 GHz)

* Power Divider : WEINSCHEL / 1506A / DC-18 GHz / 3 Port

* Path Loss Information

Frequency (MHz)	RF Cable (dB)	10 dB ATT (dB)	10 dB ATT (dB)	Power Diver (dB)	Test Cable (dB)	Total Loss (dB)
1 880.00	0.45	9.62	9.61	5.78	0.60	26.06
7 519.70	0.88	9.79	9.74	5.83	0.60	26.84

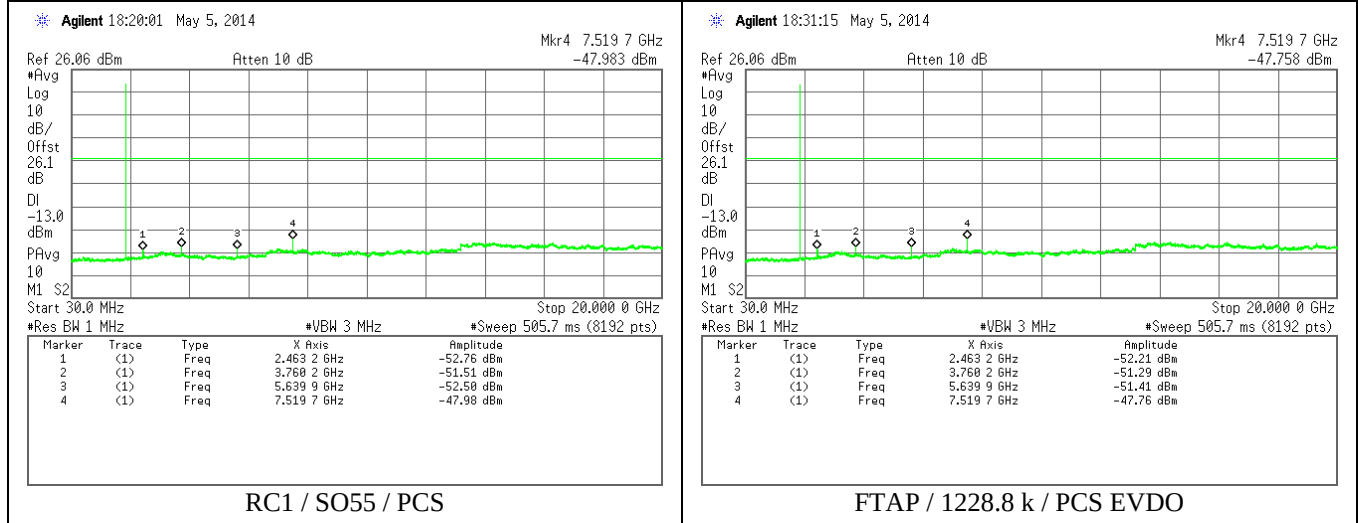
12.3 Test Result

Unit : dBm

CH : 600			FREQUENCY : 1 880.00 MHz			
Mode	Radio Config	FCH Svc opt.	Reading (dBm)	Measured Freq.(MHz)	Correct (Att, cable)	Result
PCS	1	SO55	-47.98	7519.70	0.78	-47.20
PCS EDVO Rev. 0	FTAP	1288.8 k	-47.76	7519.70	0.78	-46.98

12.4 Test Plots

* CH:600 (1 880.00 MHz)



13. Field Strength of Spurious Radiation

13.1 Definition

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm

13.2 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 3 meters from the measurement antenna.

For spurious emissions below 1 GHz quasi-peak detection is used with a resolution bandwidth of 120 kHz. The emissions were maximized by rotating the EUT and raising and lowering the measurement antenna from 1~4 meters (above 1 GHz, measure antenna from 1 ~ 3.5 meters)

Spurious/harmonic emissions above 1 GHz peak are measured with average and peak detection with a resolution bandwidth of 1 MHz (VBW = 3 MHz) and measured at a distance of 3 meter.

Average detection is used to determine compliance of the EUT if the peak does not meet the average limit. Non-harmonic emissions must satisfy the average limit and the peak limit (20 dB above average).

Correction factor is a combination of cable loss (CL), microwave amplifier gain (G amp), antenna factor (AF), hi-pass filter factor (HPF)

Example correction factor calculation: $F/S(\text{Field Strength}) = \text{Measuring Value} + \text{AF} - \text{G amp} + \text{CL} + \text{HPF}$

* Hi-Pass Filter : WAINWRIGHT / WHK3.0/18G-10SS / 3.0-18 GHz pass filter

The EIRP limits in dBm were converted to field strength limits in $\text{dB}\mu\text{V/m}$ @ 3m.

Example EIRP limit conversion: $F/S(\text{Field Strength}) = \text{EIRP} + 95.2$

It was performed according to the KDB 971168 v02r01 5.8.3. Mathematical conversions.

Both vertical and horizontal polarities were tested and the worst case presented. In all cases the vertical polarization resulted in the greatest signal.

There were no measurable emissions above 18 GHz, up to 40 GHz. The measurement noise floor is well below the specified limit. Measurements in the table above for emissions greater than 18 GHz are of the noise floor.

13.3 Test Results

13.3.1 mode : PCS 600CH/ RC1 / SO55 / XY SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	XY	59.86	29.54	40.88	7.38	0.65	56.55	-38.65	-13.00	25.65
5643.00	V	XY	59.31	32.29	40.03	9.36	0.37	61.30	-33.90	-13.00	20.90
3759.00	H	XY	61.86	29.54	40.88	7.38	0.65	58.55	-36.65	-13.00	23.65
5643.00	H	XY	57.39	32.29	40.03	9.36	0.37	59.38	-35.82	-13.00	22.82

13.3.2 mode : PCS EVDO 600CH/ FTAP / 1228.8 k / XY SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	XY	64.22	29.54	40.88	7.38	0.65	60.91	-34.29	-13.00	21.29
5640.00	V	XY	61.78	32.28	40.03	9.36	0.37	63.76	-31.44	-13.00	18.44
3759.00	H	XY	59.82	29.54	40.88	7.38	0.65	56.51	-38.69	-13.00	25.69
5640.00	H	XY	59.19	32.28	40.03	9.36	0.37	61.17	-34.03	-13.00	21.03

13.3.3 mode : PCS 600CH/ RC1 / SO55 / YZ SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	YZ	54.30	29.54	40.88	7.38	0.65	50.99	-44.21	-13.00	31.21
5643.00	V	YZ	55.56	32.29	40.03	9.36	0.37	57.55	-37.65	-13.00	24.65
3759.00	H	YZ	57.22	29.54	40.88	7.38	0.65	53.91	-41.29	-13.00	28.29
5643.00	H	YZ	52.47	32.29	40.03	9.36	0.37	54.46	-40.74	-13.00	27.74

13.3.4 mode : PCS EVDO 600CH/ FTAP / 1228.8 k / YZ SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	YZ	58.23	29.54	40.88	7.38	0.65	54.92	-40.28	-13.00	27.28
5643.00	V	YZ	61.35	32.29	40.03	9.36	0.37	63.34	-31.86	-13.00	18.86
3759.00	H	YZ	61.33	29.54	40.88	7.38	0.65	58.02	-37.18	-13.00	24.18
5643.00	H	YZ	55.94	32.29	40.03	9.36	0.37	57.93	-37.27	-13.00	24.27

13.3.5 mode : PCS 600CH/ RC1 / SO55 / ZX SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	ZX	58.28	29.54	40.88	7.38	0.65	54.97	-40.23	-13.00	27.23
5640.00	V	ZX	55.83	32.28	40.03	9.36	0.37	57.81	-37.39	-13.00	24.39
3759.00	H	ZX	59.14	29.54	40.88	7.38	0.65	55.83	-39.37	-13.00	26.37
5643.00	H	ZX	57.96	32.29	40.03	9.36	0.37	59.95	-35.25	-13.00	22.25

13.3.6 mode : PCS EVDO 600CH/ FTAP / 1228.8 k / ZX SCAN

Emission Frequency (MHz)	ANT (H/V)	EUT (X,Y,Z)	Measure Value (dBμV)	Antenna Factor [dB/m]	Amp Gain (dB)	Cable loss (dB)	High Pass Filter (dB)	F/S (dBμV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3759.00	V	ZX	60.65	29.54	40.88	7.38	0.65	57.34	-37.86	-13.00	24.86
5640.00	V	ZX	57.06	32.28	40.03	9.36	0.37	59.04	-36.16	-13.00	23.16
3759.00	H	ZX	60.48	29.54	40.88	7.38	0.65	57.17	-38.03	-13.00	25.03
5643.00	H	ZX	60.02	32.29	40.03	9.36	0.37	62.01	-33.19	-13.00	20.19

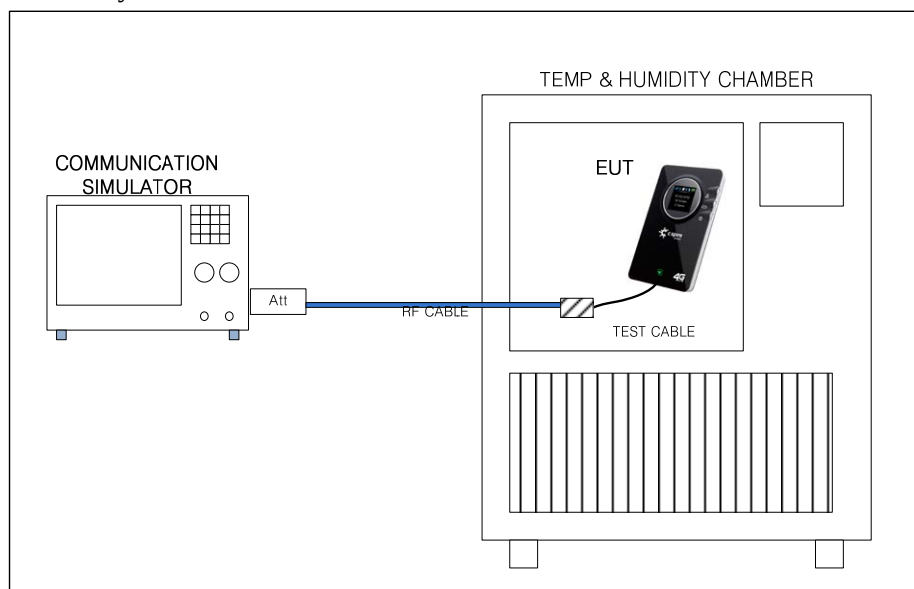
14. Frequency Stability

14.1 Definition

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block

14.2 Test Procedure

- Device is placed at the Temp & Humidity Chamber. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition



* EUT test mode is RC1/SO55/600CH(1880 MHz)

* Temp is change -30 degree to +50 degree (10 degree step)

* Volt is change DC 3.0V(Cut Off Voltage) to DC 4.3V(Normal Volt : DC 3.7 V +115%)

* Temp&Humidity chamber : BUMJIN / BJ-THC-667L / 201203-JNDL/ -40 $^{\circ}\text{C}$ ~+150 $^{\circ}\text{C}$ / Due to Cal: 2015-03-24

* DC Power Supply : Agilent / E3630A / MY40004023 / 0 ~ 24V / 0 ~ 2.5A / Due to Cal: 2014-10-15

14.3 Test Results

14.3.1 Frequency error vs. Temperature

Temp (degree)	Measure (Hz)	Measure (ppm)	Limit (ppm)
-30.0	7.77	0.004	2.5
-20.0	9.23	0.005	2.5
-10.0	7.62	0.004	2.5
0.0	7.39	0.004	2.5
10.0	6.86	0.004	2.5
20.0	16.41	0.009	2.5
30.0	14.9	0.008	2.5
40.0	8.39	0.004	2.5
50.0	10.59	0.006	2.5

14.3.2 Frequency error vs. Voltage

Voltage (V)	Measure (Hz)	Measure (ppm)	Limit (ppm)
3.0	14.19	0.008	2.5
3.7	13.79	0.007	2.5
4.3	15.8	0.008	3.5

* Measure (ppm) = Measure (Hz) $\div$ 1 880.00 MHz

14.4 Test Plots

14.4.1 Frequency error vs. Temperature

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9956	0.9993	0.9977	Cell Power	-75.00			
	Frequency Error (Hz)	2.37	7.77	5.07		dBm/1.23 MHz			
	Time Error (us)	0.16	0.33	0.24	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-63.47	-45.71	-51.52	Channel	600			
	Phase Error (*)	1.23	1.46	1.37	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.55	6.18	3.82	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

-30 °C / RC1 / SO55 / 600 CH

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9959	0.9994	0.9977	Cell Power	-75.00			
	Frequency Error (Hz)	2.73	9.23	5.92		dBm/1.23 MHz			
	Time Error (us)	0.47	0.61	0.54	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-63.64	-48.13	-55.75	Channel	600			
	Phase Error (*)	1.22	1.41	1.32	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.54	6.01	3.82	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

-20 °C / RC1 / SO55 / 600 CH

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9955	0.9994	0.9974	Cell Power	-75.00			
	Frequency Error (Hz)	0.47	7.62	4.55		dBm/1.23 MHz			
	Time Error (us)	0.10	0.24	0.16	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-76.58	-48.22	-56.66	Channel	600			
	Phase Error (*)	1.22	1.38	1.30	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.51	6.37	4.21	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

-10 °C / RC1 / SO55 / 600 CH

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9956	0.9994	0.9974	Cell Power	-75.00			
	Frequency Error (Hz)	3.04	7.39	5.06		dBm/1.23 MHz			
	Time Error (us)	0.36	0.49	0.44	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-64.49	-49.15	-56.66	Channel	600			
	Phase Error (*)	1.17	1.41	1.25	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.43	6.31	4.29	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

0 °C / RC1 / SOS55 / 600 CH

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9950	0.9995	0.9970	Cell Power	-75.00			
	Frequency Error (Hz)	-6.36	16.41	6.87		dBm/1.23 MHz			
	Time Error (us)	0.35	0.50	0.41	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-76.32	-47.28	-54.75	Channel	600			
	Phase Error (*)	1.13	1.40	1.26	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.32	6.73	4.60	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

10 °C / RC1 / SO55 / 600 CH

Measurement/Instrument Screen									
Waveform Quality: Numeric Rho									
Control	Minimum			Maximum			Average		
Waveform Quality Setup	Rho	0.9950	0.9995	0.9970	Cell Power	-75.00			
	Frequency Error (Hz)	-6.36	16.41	6.87		dBm/1.23 MHz			
	Time Error (us)	0.35	0.50	0.41	Cell Band	US PCS			
	Carrier Feedthrough (dBc)	-76.32	-47.28	-54.75	Channel	600			
	Phase Error (*)	1.13	1.40	1.26	Protocol Rev	6 (IS-2000-0)			
	Mag Error (Z)	1.32	6.73	4.60	Radio Config	(Fud1, Rvs1)			
					S055 (Loopback)				
					FCH Service Option Setup				
	Active Cell	Connected			Sys Type: IS-2000				
1 of 2	IntRef	Offset							1 of 4

20 °C / RC1 / SO55 / 600 CH

Measurement/Instrument Screen																		
Control		Waveform Quality: Numeric Rho				Call Params												
Waveform Quality Setup				Minimum	Maximum	Average		Cell Power										
		Rho		0.9952	0.9995	0.9973		-75.00										
		Frequency Error (Hz)		2.48	14.90	8.14		dBm/1.23 MHz										
		Time Error (us)		0.31	0.45	0.35		Cell Band										
		Carrier Feedthrough (dBc)		-76.37	-48.15	-55.33		US PCS										
		Phase Error (°)		1.07	1.37	1.22		Channel										
		Mag Error (Z)		1.27	6.62	4.32		600										
		100 /100		Single		Protocol Rev												
						6 (IS-2000-0)												
						Radio Config												
1 of 2								1 of 4										
30 °C / RC1 / SO55 / 600 CH																		
Measurement/Instrument Screen																		
Control		Waveform Quality: Numeric Rho				Call Params												
Waveform Quality Setup				Minimum	Maximum	Average		Cell Power										
		Rho		0.9961	0.9995	0.9976		-75.00										
		Frequency Error (Hz)		1.25	8.39	4.90		dBm/1.23 MHz										
		Time Error (us)		0.31	0.42	0.34		Cell Band										
		Carrier Feedthrough (dBc)		-77.03	-47.42	-55.81		US PCS										
		Phase Error (°)		1.06	1.20	1.13		Channel										
		Mag Error (Z)		1.31	5.99	4.12		600										
		100 /100		Single		Protocol Rev												
						6 (IS-2000-0)												
						Radio Config												
1 of 2								1 of 4										
40 °C / RC1 / SO55 / 600 CH																		
Measurement/Instrument Screen																		
Control		Waveform Quality: Numeric Rho				Call Params												
Waveform Quality Setup				Minimum	Maximum	Average		Cell Power										
		Rho		0.9959	0.9994	0.9979		-75.00										
		Frequency Error (Hz)		3.13	10.59	6.21		dBm/1.23 MHz										
		Time Error (us)		0.07	0.20	0.12		Cell Band										
		Carrier Feedthrough (dBc)		-86.12	-50.14	-57.99		US PCS										
		Phase Error (°)		1.09	1.31	1.20		Channel										
		Mag Error (Z)		1.44	6.09	3.84		600										
		100 /100		Single		Protocol Rev												
						6 (IS-2000-0)												
						Radio Config												
1 of 2								1 of 4										
50 °C / RC1 / SO55 / 600 CH																		
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14.4.2 Frequency error vs. Voltage

Measurement/Instrument Screen												
Control		Waveform Quality: Numeric Rho							Call Params			
Waveform Quality Setup	▼	Rho		Minimum	Maximum	Average			Cell Power			
				0.9950	0.9994	0.9974			-75.00			
		Frequency Error (Hz)		0.81	14.19	5.52			dBm/1.23 MHz			
		Time Error (us)		0.07	0.20	0.15			Cell Band			
		Carrier Feedthrough (dBc)		-72.84	-46.98	-54.29			US PCS			
		Phase Error (*)		1.15	1.45	1.26			Channel			
		Mag Error (Z)		1.42	6.69	4.33			600			
		100 / 100		Single							Protocol Rev	
									6 (IS-2000-0)			
									Radio Config			
									(Fud1, Rvs1)			
									S055 (Loopback)			
									FCH Service Option Setup			
									▼			
		Active Cell		Sys Type: IS-2000								
		Connected										
1 of 2				IntRef	Offset							1 of 4

DC 3.0V / RC1 / SO55/ 600 CH

Measurement/Instrument Screen												
Control		Waveform Quality: Numeric Rho							Call Params			
Waveform Quality Setup	▼	Rho		Minimum	Maximum	Average			Cell Power			
				0.9950	0.9994	0.9974			-75.00			
		Frequency Error (Hz)		1.52	13.79	5.45			dBm/1.23 MHz			
		Time Error (us)		0.12	0.25	0.15			Cell Band			
		Carrier Feedthrough (dBc)		-71.13	-45.99	-53.90			US PCS			
		Phase Error (*)		1.16	1.44	1.26			Channel			
		Mag Error (Z)		1.46	6.64	4.28			600			
		100 / 100		Single							Protocol Rev	
									6 (IS-2000-0)			
									Radio Config			
									(Fud1, Rvs1)			
									S055 (Loopback)			
									FCH Service Option Setup			
									▼			
		Active Cell		Sys Type: IS-2000								
		Connected										
1 of 2				IntRef	Offset							1 of 4

DC 3.7V / RC1 / SO55/ 600 CH

Measurement/Instrument Screen												
Control		Waveform Quality: Numeric Rho							Call Params			
Waveform Quality Setup	▼	Rho		Minimum	Maximum	Average			Cell Power			
				0.9951	0.9994	0.9975			-75.00			
		Frequency Error (Hz)		1.06	15.80	5.81			dBm/1.23 MHz			
		Time Error (us)		0.08	0.19	0.16			Cell Band			
		Carrier Feedthrough (dBc)		-71.29	-48.26	-54.69			US PCS			
		Phase Error (*)		1.18	1.45	1.26			Channel			
		Mag Error (Z)		1.45	6.68	4.14			600			
		100 / 100		Single							Protocol Rev	
									6 (IS-2000-0)			
									Radio Config			
									(Fud1, Rvs1)			
									S055 (Loopback)			
									FCH Service Option Setup			
									▼			
		Active Cell		Sys Type: IS-2000								
		Connected										
1 of 2				IntRef	Offset							1 of 4

DC 4.3V / RC1 / SO55/ 600 CH

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