

FCC PART 22/24/27 TEST REPORT					
FCC Part 22 /Part 24/ Part 27					
Report Reference No					
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Date of issue	• •				
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Applicant's name					
Address	: 140-2, Kye-dong, Chongro-ku, Seou	II, South Korea.			
Test specification	:				
	FCC Part 22: PUBLIC MOBILE SE				
Standard FCC Part 24: PERSONAL COMMUNICATIONS SERVICES					
	FCC Part 27: MISCELLANEOUS W SERVICES	/IRELESS COMMUNICATIONS			
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Test item description					
Trade Mark					
Manufacturer	SKYCOM TELECOMMUNICATION	S CO., LIMITED			
Model/Type reference	: L445				
Listed Models	: N/A				
Ratings	: DC 3.70V				
Modulation	: QPSK				
Hardware version	: 5096SF_MM1_V01				
Software version	: HYUNDAI_L445_V5.0.2_20150907				
Frequency	. UMTS Band II/ UMTS Band IV/ UM	rs Band V			
Result	PASS				

TEST REPORT

Test Report No. :		IWR150900602	Sep 22, 2015		
			Bate of fields		
Equipment under Test	:	Mobile Phone			
Model /Type	:	L445			
Listed Models	:	N/A			
Applicant	:	HYUNDAI CORPORAT	ION		
Address	:	140-2, Kye-dong, Chong	gro-ku, Seoul, South Korea.		
Manufacturer	:	SKYCOM TELECOMM	UNICATIONS CO., LIMITED		
Address	:	Rm604, East Block, She Chegongmiao, Futian D	engtang Bldg., No.1, Tairan 9 Rd., istrict, Shenzhen, China		

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Part 22 (10-1-12 Edition): PRIVATE LAND MOBILE RADIO SERVICES.

FCC Part 24(10-1-12 Edition): PUBLIC MOBILE SERVICES

FCC Part 27(10-1-12 Edition): MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

<u>TIA/EIA 603 D June 2010:</u> Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

ANSI C63.4:2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

FCCKDB971168D01 Power Meas License Digital Systems

2. <u>SUMMARY</u>

2.1. General Remarks

Date of receipt of test sample	:	Aug 20, 2015
Testing commenced on	:	Aug 21, 2015
Testing concluded on	:	Sep 22, 2015

2.2. Product Description

The **HYUNDAI CORPORATION** 's Model: L445 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Mobile Phone
Model Number	L445
Mandilation Truck	GMSK for GSM/GPRS, 8-PSK for EDGE, QPSK for UMTS,
Modilation Type	QPSK, 16QAM for LTE
Antenna Type	Internal
UMTS Operation Frequency Band	Device supported UMTS FDD Band II/IV/V
	IEEE 802.11b:2412-2462MHz
	IEEE 802.11g:2412-2462MHz
WLAN FCC Operation frequency	IEEE 802.11n HT20:2412-2462MHz
	IEEE 802.11n HT40:2422-2452MHz
BT FCC Operation frequency	2402MHz-2480MHz
HSDPA Release Version	Release 10
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
WCDMA Release Version	R99
LTE Release Version	R8
UMTS Operation Frequency Band	Device supported FDD band 2, FDD band 4, FDD band 5,
	FDD band 7, FDD band 17
	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
WLAN FCC Modulation Type	IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
WLAN FCC Modulation Type	IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)
	IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
BT Modulation Type	GFSK (BT 4.0)/GFSK,8DPSK,π/4DQPSK(BT 3.0+EDR)
Hardware version	5096SF_MM1_V01
Software version	HYUNDAI_L445_V5.0.2_20150907
Android version	Android 4.4.2
GPS function	Supported
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Supported BT 4.0/BT 3.0+EDR
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM/EDGE/GPRS Power Class	GSM900:Power Class 4/DCS1800:Power Class 1
GSM/EDGE/GPRS Operation Frequency	GSM900 :880MHz-915MHz/DCS1800:1710MHz-1785MHz
GSM/EDGE/GPRS Operation Frequency	GSM900/DCS1800/GPRS900/ GPRS
Band	1800/EDGE900/EDGE1800
GSM Release Version	R99
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.40VDC to 4.20VDC (nominal: 3.70VDC)
GPRS operation mode	Class B

2.3. Equipment under Test

Power supply system utilised

Power supply voltage	:	0	120V / 60 Hz	0	115V / 60Hz
		0	12 V DC	0	24 V DC
		•	Other (specified in blank bel	ow)

<u>DC 3.70V</u>

Test frequency list

Test Mode	TX/RX	RF Channel				
Test Mode		Low(L)	Middle (M)	High (H)		
	ТХ	Channel 4132	Channel 4182	Channel 4233		
WCDMA850	IA	826.4 MHz	836.4 MHz	846.6 MHz		
VVCDIVIA050	RX	Channel 4357	Channel 4407	Channel 4458		
	ГЛ	871.4 MHz	881.4 MHz	891.6 MHz		
Test Mode	TX/RX		RF Channel			
Test Mode		Low(L)	Middle (M)	High (H)		
	ТХ	Channel 9262	Channel 9400	Channel 9538		
WCDMA1900		1852.4 MHz	1880.0 MHz	1907.6 MHz		
	RX	Channel 9662	Channel 9800	Channel 9938		
		1932.4 MHz	1960.0 MHz	1987.6 MHz		
Test Mode	TX/RX	RF Channel				
Test Mode		Low(L)	Middle (M)	High (H)		
	ТХ	Channel1312	Channel1413	Channel1513		
WCDMA1700		1712.4MHz	1732.6MHz	1752.6MHz		
	RX	Channel1537	Channel1638	Channel1738		
		2112.4MHz	2132.6MHz	2152.6MHz		

2.4. Short description of the Equipment under Test (EUT)

2.4.1 General Description

L445 is subscriber equipment in the WCDMA/GSM /LTE system. The HSPA/UMTS frequency band is Band II, Band IV and Band V, LTE frequency band is band 2.band 4,band 5,band 7,band 17; The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only Band II and Band V and GSM850 and PCS1900 bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSPA/UMTS ,LTE and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and SIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

2.5. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger

AE1 Model: TPA-5950100UU INPUT: 100-240V 50/60Hz 0.2A OUTPUT: DC 5.0V,1000mAh

*AE ID: is used to identify the test sample in the lab internally.

2.6. Normal Accessory setting

Fully charged battery was used during the test.

2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

• - supplied by the manufacturer

 $\ensuremath{\bigcirc}$ - supplied by the lab

0	Power Cable	Length (m) :	/
		Shield :	1
		Detachable :	1
Ο	Multimeter	Manufacturer :	1
		Model No. :	1

2.8. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: RQQHLT-L40SCL** filing to comply with FCC Part 22, Part 24 and Part 27 Rules.

2.9. Modifications

No modifications were implemented to meet testing criteria.

2.10. General Test Conditions/Configurations

2.10.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description	
UMTS/TM1	WCDMA system, QPSK modulation	
UMTS/TM2	HSDPA system, QPSK modulation	
UMTS/TM3	HSUPA system, QPSK modulation	

Note:

- 1. This EUT owns two SIM cards, after we perform the pretest for these two SIM cards; we found the SIM 1 is the worst case, so its result is recorded in this report.
- WCDMA, HSDPA HSUPA and use same modulation type (QPSK), we test only WCDMA/ UMTS/TM1 mode according to 3GPP TS 134 121 requirement.

2.10.2 Test Environment

Environment Parameter	Selected Values During Tests			
Relative Humidity	Ambient			
Temperature	TN	Ambient		
	VL	3.4V		
Voltage	VN	3.7V		
	VH	4.2V		

NOTE: VL=lower extreme test voltage VN=nominal voltage VH=upper extreme test voltage TN=normal temperature

3. <u>TEST ENVIRONMENT</u>

3.1. Address of the test laboratory

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

FCC-Registration information:

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter fr om the FCC is maintained in our files. Registration 406086, valid time is until October 28, 2017.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

3.4.1 Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule	Requirements	Verdict	
Effective (Isotropic) Radiated Output Power	No. §2.1046, §22.913	FCC: ERP ≤ 7W.	Pass	
Modulation Characteristics	§2.1047	Digital modulation	N/A	
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass	
Band Edges Compliance	§2.1051, §22.917	≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.	Pass	
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: ≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass	
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: ≤ -13dBm/100kHz.	Pass	
Frequency Stability	Frequency Stability $\S2.1055,$ $\S22.355$ $\le \pm 2.5$ ppm.			
NOTE 1: For the verdict, t	he "N/A" denotes	s "not applicable", the "N/T" de notes "not tested".		

3.4.2 PCS Band (1850-1915MHz paired with 1930-1995MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Output Power	§2.1046, §24.232	EIRP ≤ 2W	Pass
Peak-Average Ratio	§2.1046, §24.232	FCC:Limit≤13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §24.238	 ≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block. 	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	≤-13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	≤ -13dBm/1MHz.	Pass
Frequency Stability	§2.1055, §24.235	FCC: within authorized frequency block.	Pass
NOTE 1: For the verdict, t	he "N/A" denotes	s "not applicable", the "N/T" de notes "not tested".	

Remark:

1. The measurement uncertainty is not included in the test result.

3.4.3 AWS Band (1710-1755MHz pairedwith 2110-2155MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Output Power	§2.1046, §27.50(d)	EIRP ≤ 1W;	Pass
Peak-Average Ratio	§2.1046, §27.50(d)	Limit≤13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(h)	 ≤ -13dBm/1%*EBW,in1MHz bands immediately outside and adjacent to The frequency block. 	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	≤ -13dBm/1MHz, from 9kHz to 10 th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Pass
Frequency Stability	§2.1053, §27.53(h)	≤ -13dBm/1MHz.	Pass
NOTE 1: For the verdict, t	he "N/A" denote	s "not applicable", the "N/T" de notes "not tested".	

3.5. Equipments Used during the Test

Description	Manufacturer	Model	Serial No.	Test Date	Due Date
EMI Test Receiver	R&S	ESIB26	A0304218	2015.06.02	2016.06.01
Full-Anechoic Chamber	Albatross	12.8m*6.8m *6.4m	A0412372	2015.01.05	2016.01.04
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2015.06.02	2016.06.01
Bilog Antenna	Schwarzbeck	VULB 9163	9163-274	2015.06.02	2016.06.01
Bilog Antenna	Schwarzbeck	VULB 9163	9163-276	2015.06.02	2016.06.01
Double ridge horn antenna	R&S	HF960	100150	2015.06.02	2016.06.01
Double ridge horn antenna	R&S	HF960	100155	2015.06.02	2016.06.01
Ultra-wideband antenna	R&S	HL562	100089	2015.06.02	2016.06.01
Ultra-wideband antenna	R&S	HL562	100090	2015.06.02	2016.06.01
Test Antenna – Horn (18-25GHz)	ETS	UG-596A/U	A0902607	2015.06.02	2016.06.01
Test Antenna – Horn (18-25GHz)	ETS	UG-596A/U	A0902611	2015.06.02	2016.06.01
Amplifier 20M~3GHz	R&S	PAP-0203H	22018	2015.06.02	2016.06.01
Ampilier 1G~18GHz	R&S	MITEQ AFS42- 00101800	25-S-42	2015.06.02	2016.06.01
Ampilier 18G~40GHz	R&S	JS42- 18002600- 28-5A	12111.0980. 00	2015.06.02	2016.06.01
System Simulator	R&S	CMW500	A130101034	2015.06.010	2016.06.09
Signal Generator	R&S	SMF100A	A0304267	2015.06.010	2016.06.09
Signal Analyzer	Agilent	N9030A	MY49430428	2015.06.010	2016.06.09

The calibration interval was one year.

4. TEST CONDITIONS AND RESULTS

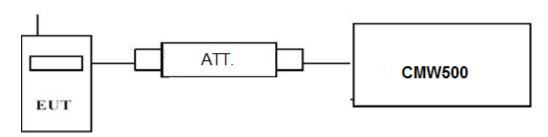
4.1. Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1. Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a CMW500 by an Att.
- c) EUT Communicate with CMW500 then selects a channel for testing.
- d) Add a correction factor to the display CMW500, and then test.

TEST RESULTS

See next page

Test Mode	Test Chennel	Burst Av	erage Conducted pov	ver (dBm)
Test Mode	Test Channel	UMTS Band V	UMTS Band IV	UMTS Band II
	LCH	23.23	22.78	22.48
UMTS/TM1	MCH	23.13	22.75	22.30
	HCH	23.20	22.69	22.41
	LCH_SubTest-1	22.25	21.71	21.49
	LCH_SubTest-2	21.54	20.98	20.83
	LCH_SubTest-3	21.56	21.00	20.71
	LCH_SubTest-4	21.52	20.94	20.69
	MCH_SubTest-1	22.14	21.74	21.29
	MCH_SubTest-2	21.44	21.04	20.59
UMTS/TM2	MCH_SubTest-3	21.35	21.01	20.54
	MCH_SubTest-4	21.36	20.95	20.52
	HCH_SubTest-1	22.19	21.69	21.38
	HCH_SubTest-2	21.56	21.00	20.68
	HCH_SubTest-3	21.59	20.91	20.61
	HCH_SubTest-4	21.55	20.88	20.64
	LCH_SubTest-1	20.02	19.61	19.21
	LCH_SubTest-2	20.04	19.54	19.23
	LCH_SubTest-3	16.32	20.50	20.22
	LCH_SubTest-4	19.51	19.02	18.68
	LCH_SubTest-5	20.51	20.07	19.69
	MCH_SubTest-1	19.91	19.62	19.04
	MCH_SubTest-2	19.94	19.55	19.03
UMTS/TM3	MCH_SubTest-3	20.93	20.54	20.05
	MCH_SubTest-4	19.40	18.94	18.50
	MCH_SubTest-5	20.39	20.11	19.51
	HCH_SubTest-1	20.04	19.54	19.19
	HCH_SubTest-2	19.98	19.53	19.17
	HCH_SubTest-3	21.02	20.44	20.20
	HCH_SubTest-4	19.48	18.91	18.67
	HCH_SubTest-5	20.50	20.00	19.67

4.1.2. Radiated Output Power

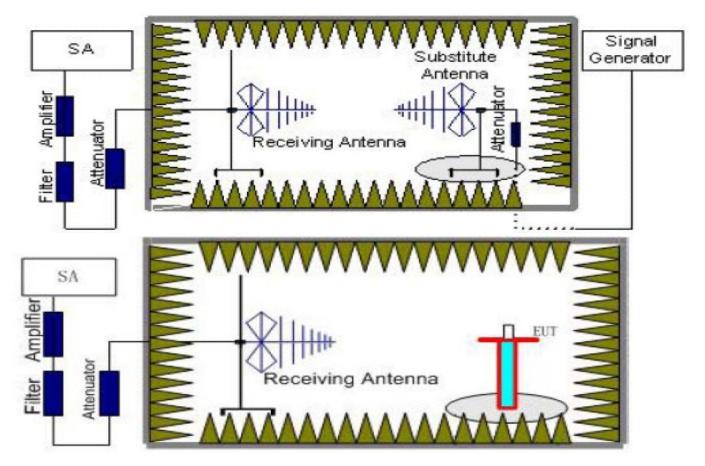
TEST DESCRIPTION

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. Peak power" and 24.232(e) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

Per Part 27.50(d) (4) specifies, Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755MHz band are limited to 1W EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

TEST CONFIGURATION



TEST PROCEDURE

- EUT was placed on a 0.80 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 0.80m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
- 2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
- 3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=10MHz,VBW=10MHz, And the maximum value of the receiver should be recorded as (P_r).
- 4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed

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to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test. The measurement results are obtained as described below: Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a We used SMF100A micowave signal generator which signal level can up to 33dBm, so we not used power Amplifier for substituation test; The measurement results are amend as described below:

Power(EIRP)= P_{Mea} - P_{cl} + G_a This value is EIRP sizes the measurement is selibrated using an entering of linear pair (2.45 dBi) and

- 6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- 7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST LIMIT

Note: We test the H direction and V direction and V direction is worse.

According to 22.913(a), 24.232(c) and 27.50(d) (4), the ERP(EIRP) should be not exceeding following table limits:

	Burst Average EIRP
UMTS Band II	33dBm (2W)
	Burst Average EIRP
UMTS Band IV	30dBm (1W)
	Burst Average ERP
UMTS Band V	38.45dBm (7W)

TEST RESULTS

Remark:

- 1. We were tested all Configuration refer 3GPP TS134 121.
- 2. $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_{a}(dBi)$
- 3. ERP = EIRP 2.15dBi as EIRP by subtracting the gain of the dipole.

UMTS/TM1/UMTS Band II

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Ga Antenna Gain(dB)	PAg (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.4	-20.31	3.41	10.24	33.60	20.12	33.01	12.89	Н
1880.0	-20.16	3.49	10.24	33.60	20.19	33.01	12.82	Н
1907.6	-20.20	3.55	10.23	33.60	20.08	33.01	12.93	Н

UMTS/TM1/UMTS Band V

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-24.53	2.42	8.45	2.15	36.82	16.17	38.45	22.28	V
836.60	-23.90	2.46	8.45	2.15	36.82	16.76	38.45	21.69	V
848.80	-24.29	2.53	8.36	2.15	36.82	16.21	38.45	22.24	V

UMTS/TM1/UMTS Band IV

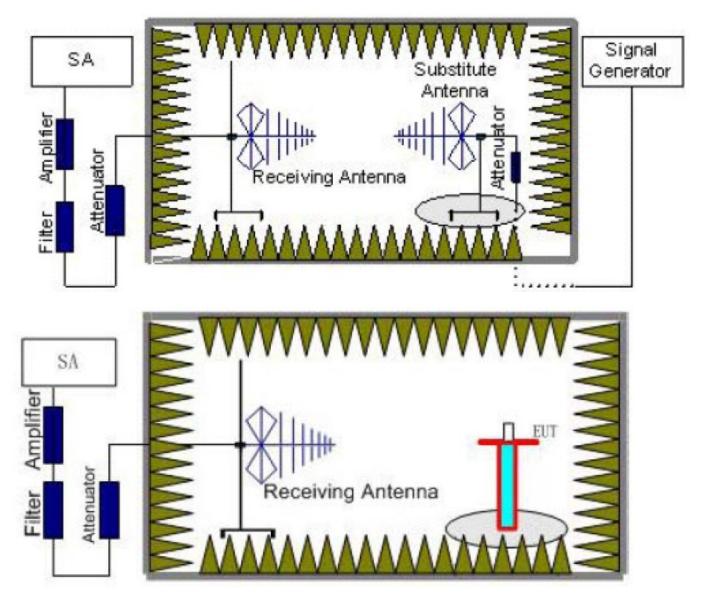
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.4	-25.19	3.06	9.68	34.80	16.23	30.00	13.77	Н
1732.6	-24.46	3.17	9.68	34.80	16.85	30.00	13.15	Н
1752.6	-24.98	3.22	9.75	34.80	16.35	30.00	13.65	Н

4.2. Radiated Spurious Emssion

TEST APPLICABLE

According to the TIA/EIA 603D:2010 test method, The Receiver or Spectrum was scanned from 9 KHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz The resolution bandwidth is set as outlined in Part 24.238, Part 22.917 and Part 27.54. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II WCDMA Band IV and WCDMA Band V.

TEST CONFIGURATION



TEST PROCEDURE

- EUT was placed on a 0.80 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 0.80m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
- 2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

- 3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
- 4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
- 5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test. The measurement results are obtained as described below: Power(EIRP)=P_{Mea}- P_{Ag} P_{cl} + G_a
- 6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- 7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
- 8. In order to make sure test results more clearly, we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
UMTS/TM1/	0.03~1	100KHz	300KHz	10
WCDMA Band V	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
UMTS/TM1/	2~5	1 MHz	3 MHz	3
WCDMA Band II	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2
	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
UMTS/TM1/	1~2	1 MHz	3 MHz	2
WCDMA Band IV	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3

TEST LIMITS

According to 24.238, 22.917 and 27.54 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Frequency	Channel	Frequency Range	Verdict
UMTS/TM1/ WCDMA	Low	9KHz-10GHz	PASS
Band V	Middle	9KHz -10GHz	PASS
Ballu V	High	9KHz -10GHz	PASS
UMTS/TM1/ WCDMA	Low	9KHz -20GHz	PASS
Band II	Middle	9KHz -20GHz	PASS
Banu II	High	9KHz -20GHz	PASS
UMTS/TM1/ WCDMA	Low	9KHz -18GHz	PASS
Band IV	Middle	9KHz -48GHz	PASS
Band IV	High	9KHz -48GHz	PASS

TEST RESULTS

Remark:

1. We were tested all Configuration refer 3GPP TS134 121.

2. $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_{a}(dBi)$ 3. ERP = EIRP - 2.15dBi as EIRP by subtracting the gain of the dipole.

UMTS/TM1/ WCDMA Band II _ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3704.8	-40.59	4.39	3.00	12.34	-32.64	-13.00	19.64	Н
5557.2	-46.39	5.31	3.00	13.52	-38.18	-13.00	25.18	Н
3704.8	-46.65	4.39	3.00	12.34	-38.70	-13.00	25.70	V
5557.2	-51.67	5.31	3.00	13.52	-43.46	-13.00	30.46	V

UMTS/TM1/ WCDMA Band II _ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.0	-45.07	4.41	3.00	12.34	-37.14	-13.00	24.14	Н
5640.0	-49.95	5.38	3.00	13.58	-41.75	-13.00	28.75	Н
3760.0	-48.51	4.41	3.00	12.34	-40.58	-13.00	27.58	V
5640.0	-55.19	5.38	3.00	13.58	-46.99	-13.00	33.99	V

UMTS/TM1/ WCDMA Band II _ High Channel

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3815.2	-46.04	4.45	3.00	12.45	-38.04	-13.00	25.04	Н
5722.8	-54.66	5.47	3.00	13.66	-46.47	-13.00	33.47	Н
3815.2	-49.28	4.45	3.00	12.45	-41.28	-13.00	28.28	V
5722.8	-58.37	5.48	3.00	13.66	-50.19	-13.00	37.19	V

UMTS/TM1/ WCDMA Band V Low Channel

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1652.8	-39.63	3.00	3.00	9.58	-33.05	-13.00	20.05	Н
2479.2	-45.80	3.03	3.00	10.72	-38.11	-13.00	25.11	Н
1652.8	-44.47	3.00	3.00	9.68	-37.79	-13.00	24.79	V
2479.2	-49.12	3.03	3.00	10.72	-41.43	-13.00	28.43	V

UMTS/TM1/ WCDMA Band V _ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1672.8	-36.37	3.00	3.00	9.58	-29.79	-13.00	16.79	Н
2509.2	-44.63	3.03	3.00	10.72	-36.94	-13.00	23.94	Н
1672.8	-42.14	3.00	3.00	9.68	-35.46	-13.00	22.46	V
2509.2	-51.81	3.03	3.00	10.72	-44.12	-13.00	31.12	V

Frequency (MHz)	P _{Mea} (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.2	-38.25	3.00	3.00	9.58	-31.67	-13.00	18.67	Н
2539.8	-46.47	3.03	3.00	10.72	-38.78	-13.00	25.78	Н
1693.2	-43.14	3.00	3.00	9.68	-36.46	-13.00	23.46	V
2539.8	-50.92	3.03	3.00	10.72	-43.23	-13.00	30.23	V

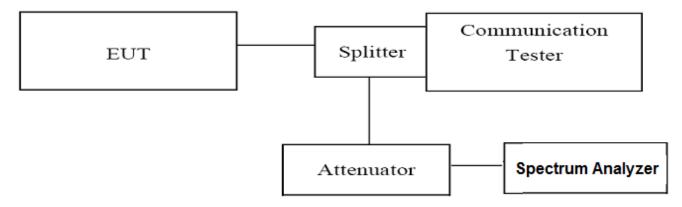
UMTS/TM1/ WCDMA Band V _ High Channel

4.3. Occupied Bandwidth and Emission Bandwith

TEST APPLICABLE

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II, WCDMA IV and WCDMA band V. The table below lists the measured 99% Bandwidth and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was set up for the max output power with pseudo random data modulation;
- 2. The Occupied bandwidth and Emission Bandwidth were measured with Aglient Spectrum Analyzer N9020A (peak);
- 3. Set RBW=100KHz,VBW=30KHz,Span=10MHz,SWT=1.267ms;
- 4. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
- 5. These measurements were done at 3 frequencies for WCDMA band II/IV/V. (low, middle and high of operational frequency range).

TEST RESULTS

	UMTS/TM1/ WCDMA Band II								
Channel Number	Frequency (MHz)	Occupied Bandwidth (99% BW) (kHz)	Emission Bandwidth (26 dBc BW) (kHz)	Verdict					
9262	1852.4	4200.8	4853	PASS					
9400	1880.0	4200.7	4846	PASS					
9538	1907.6	4205.5	4869	PASS					

	UMTS/TM1/ WCDMA Band IV								
Channel Number	Frequency (MHz)	Occupied Bandwidth (99% BW) (kHz)	Emission Bandwidth (26 dBc BW) (kHz)	Verdict					
1312	1712.4	4209.3	4848	PASS					
1413	1732.6	4212.6	4859	PASS					
1513	1752.6	4210.9	4852	PASS					

	UMTS/TM1/ WCDMA Band V								
Channel Number	Frequency (MHz)	Occupied Bandwidth (99% BW) (kHz)	Emission Bandwidth (26 dBc BW) (kHz)	Verdict					
4132	826.40	4223.5	4872	PASS					
4183	836.60	4201.6	4845	PASS					
4233	846.60	4193.9	4855	PASS					

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CF Step 1.000000 MHz Man

Freq Offset 0 Ha

Auto

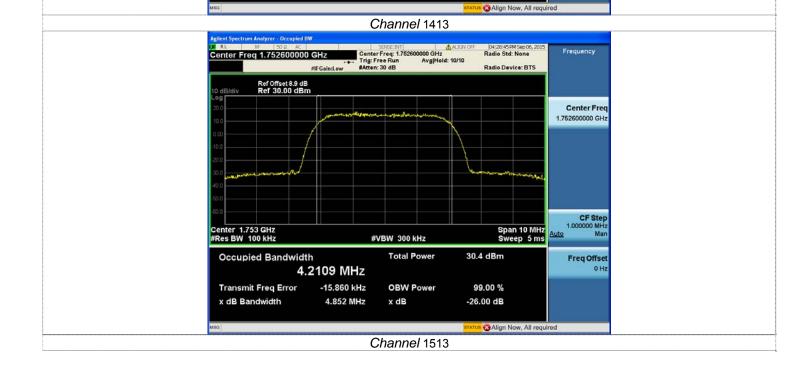
Span 10 MHz Sweep 5 ms

30.5 dBm

99.00 %

-26.00 dB

Page 21 of 61 UMTS/TM1/ WCDMA Band IV t Spectrum Analyzer - Occupied BW Center Freq: 1.712400000 GHz Trig: Free Run Avg|Hold: 10/10 R 04:28:01 PM Sep 06, 201 Radio Std: None Frequency Center Freq 1.712400000 GHz Radio Device: BTS #IFGain:Low Ref Offset 8.9 dB Ref 30.00 dBm Center Freq 1.712400000 GH CF Step 1.000000 MHz Man Center 1.712 GHz #Res BW 100 kHz Span 10 MHz Sweep 5 ms Auto #VBW 300 kHz Total Power 30.7 dBm Occupied Bandwidth Freq Offset 0 H: 4.2093 MHz Transmit Freq Error -10.553 kHz **OBW Power** 99.00 % x dB Bandwidth 4.848 MHz -26.00 dB x dB Align Now, All requ Channel1312 SENSE:INT ▲ALIGN OFF Center Freq: 1.732600000 GHz Trig: Free Run Avg|Hold: 10/10 #Atten: 30 dB 04:28:23 PM Sep 06, 201 Radio Std: None Frequency Center Freq 1.732600000 GHz #IFGain:Low Radio Device: BTS Ref Offset 8.9 dB Ref 30.00 dBm Center Freq 1.732600000 GHz



#VBW 300 kHz

x dB

Total Power

OBW Power

Center 1.733 GHz #Res BW 100 kHz

Occupied Bandwidth

Transmit Freq Error x dB Bandwidth

4.2126 MHz -4.747 kHz

4.859 MHz



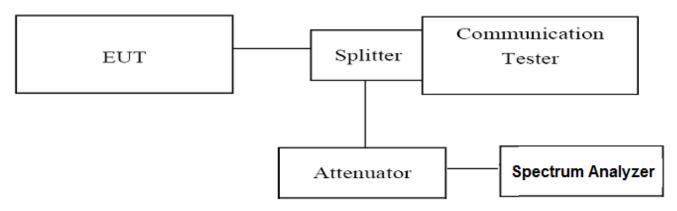
Channel 4233

4.4. Band Edge Compliance

TEST APPLICABLE

During the process of testing, the EUT was controlled via Aglient Digital Radio Communication tester (8960) to ensure max power transmission and proper modulation.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was set up for the max output power with pseudo random data modulation;
- 2. The power was measured with Aglient Spectrum Analyzer N9020A;
- 3. Set RBW=51KHz,VBW=200KHz,Span=5MHz,SWT=1ms,Dector: RMS;
- 4. These measurements were done at 2 frequencies for WCDMA Band II/IV/V. (low and high of operational frequency range).

TEST RESULTS

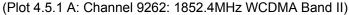
UMTS/TM1/WCDMA Band II									
Channel	Frequency	Measurement Results		Limit					
Number	Frequency (MHz)	Frequency (MHz)	Values (dBm)	(dBm)	Refer to Plot	Verdict			
9262	1852.4	1849.862	-19.696	-13.00	Plot 4.4.1 A	PASS			
9538	1907.6	1910.150	-19.493	-13.00	Plot 4.4.1 B	PASS			

UMTS/TM1/WCDMA Band IV									
Channel	Freedoment	Measureme	ent Results	Limit					
Number	Frequency (MHz)	Frequency (MHz)	Values (dBm)	(dBm)	Refer to Plot	Verdict			
1312	1712.4	1709.834	-21.350	-13.00	Plot 4.4.2 A	PASS			
1513	1752.6	1755.202	-20.518	-13.00	Plot 4.4.2 B	PASS			

	UMTS/TM1/WCDMA Band V									
Channel	Fraguanay	Measurement Results		Limit						
	nber	Frequency (MHz)	Frequency (MHz)	Values (dBm)	(dBm)	Refer to Plot	Verdict			
41	132	826.40	823.974	-18.758	-13.00	Plot 4.4.3 A	PASS			
42	233	846.60	848.172	-22.067	-13.00	Plot 4.4.3 B	PASS			

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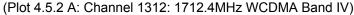




(Plot 4.5.1 B: Channel 9538: 1907.6MHz WCDMA Band II)

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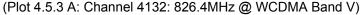




(Plot 4.5.2 B: Channel 1513: 1752.6MHz WCDMA Band IV)

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(Plot 4.5.3 B: Channel 4233: 846.6MHz @ WCDMA Band V)

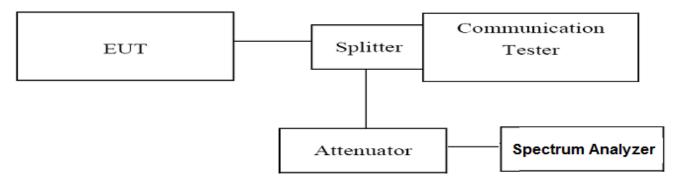
4.5. Spurious Emssion on Antenna Port

TEST APPLICABLE

The following steps outline the procedure used to measure the conducted emissions from the EUT.

- Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of WCDMA band II/IV, this equates to a frequency range of 9 KHz to 20GHz, data taken from 9 KHz to 20 GHz.For WCDMA Band V, data taken from 9 KHz to 13.6 GHz.
- 2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; if the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give an optimal sweep time according the selected span and RBW.
- The procedure to get the conducted spurious emission is as follows: The trace mode is set to MaxHold to get the highest signal at each frequency; Wait 25 seconds; Get the result.
- 4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was set up for the max output power with pseudo random data modulation;
- 2. The power was measured with Agilent Spectrum Analyzer N9030A (peak);
- 3. These measurements were done at 3 frequencies for WCDMA band II/IV/V. (low, middle and high of operational frequency range).

TEST LIMIT

Part 24.238, Part 22.917 and Part 22.54 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST RESULTS

4.6.1 For UMTS/TM1/WCDMA Band II Test Results

A. Test Verdict

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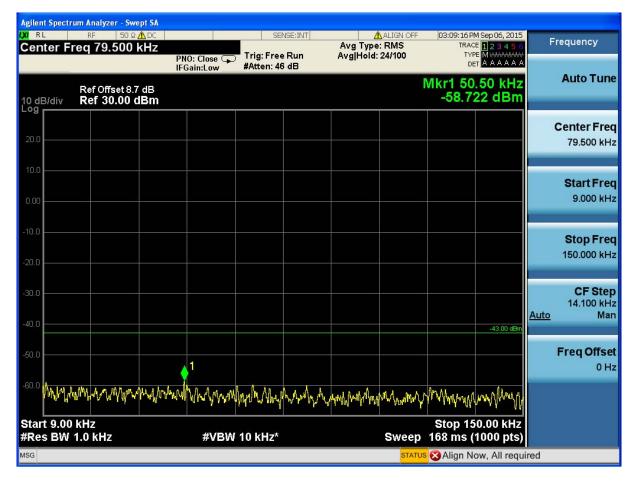
Test Mode/ Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBm)	Verdict
		9KHz-150KHz	Plot 4.5.1 A1	-13.00	PASS
		150KHz-30MHz	Plot 4.5.1 A2	-13.00	PASS
UMTS/TM1/WCDMA	1852.40	30MHz-1GHz	Plot 4.5.1 A3	-13.00	PASS
Band II/9262	1652.40	1GHz-7GHz	Plot 4.5.1 A4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.1 A5	-13.00	PASS
		13.6GHz-25GHz	Plot 4.5.1 A6	-13.00	PASS
		9KHz-150KHz	Plot 4.5.1 B1	-13.00	PASS
		150KHz-30MHz	Plot 4.5.1 B2	-13.00	PASS
UMTS/TM1/WCDMA	1880.00	30MHz-1GHz	Plot 4.5.1 B3	-13.00	PASS
Band II/9400	1000.00	1GHz-7GHz	Plot 4.5.1 B4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.1 B5	-13.00	PASS
		13.6GHz-25GHz	Plot 4.5.1 B6	-13.00	PASS
		9KHz-150KHz	Plot 4.5.1 C1	-13.00	PASS
		150KHz-30MHz	Plot 4.5.1 C2	-13.00	PASS
UMTS/TM1/WCDMA	1907.60	30MHz-1GHz	Plot 4.5.1 C3	-13.00	PASS
Band II/9538	1907.00	1GHz-7GHz	Plot 4.5.1 C4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.1 C5	-13.00	PASS
		13.6GHz-25GHz	Plot 4.5.1 C6	-13.00	PASS

Note:

1. In general, the worse case attenuation requirement shown above was applied.

2. *** means that the emission level is too low to be measured or at least 20 dB down than the limit.

B. Test Plots



(Plot 4.5.1 A1: Channel 9262: 1852.4MHz @ Traffic WCDMA Band II)

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Agiler	it Spectru	ım Analyzer -	Swept SA									
IXI R			OΩ 🚹 DC		SE	NSE:INT	Avg Type			M Sep 06, 2015 CE <mark>1 2 3 4 5 6</mark>	F	requency
Cen	ter Fr	eq 15.07	5000 M	PNO: Wide G	Trig: Free #Atten: 40		Avg Hold:	12/100	TY			
10 di Log	3/div	Ref Offset Ref 30.0							Mkr1 -61.4	150 kHz 75 dBm		Auto Tune
20.0											1000	Center Freq 5.075000 MHz
10.0 0.00												Start Freq 150.000 kHz
-10.0 -20.0											3(Stop Freq 0.000000 MHz
-30.0										-33.00 dBm	Auto	CF Step 2.985000 MHz Man
-50.0	1											Freq Offset 0 Hz
-60.0			hla ndl andap	'n ⁿ llywarn.verfllyve.	an water a strategic program in the second	v¶√ <mark>h₀i⊭</mark> ∿ri[n]	nounderland	en Malina kuran kur			7	
	t 150 I s BW	kHz 10 kHz		#VBW	30 kHz*			Sweep		0.00 MHz (1000 pts)		
MSG								STATUS	🛚 🔀 Align N	low, All requi	red	

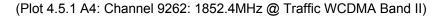
(Plot 4.5.1 A2: Channel 9262: 1852.4MHz @ Traffic WCDMA Band II)

-		m Analyzer - S									
Cen			Ω AC D0000 MH	z		NSE:INT	Avg Type		TRA	PM Sep 06, 2015 CE 1 2 3 4 5 6	Frequency
			Р	'NO: Fast 😱 Gain:Low	Trig: Free #Atten: 30		Avg Hold:	>100/100	TY E		
10 di Log		Ref Offset 8 Ref 28.90						I	Mkr1 90 -46.2	2.9 MHz 90 dBm	Auto Tune
18.9											Center Freq 515.000000 MHz
8.90 -1.10											Start Freq 30.000000 MHz
-11.1 -21.1										-13.00 dBm	Stop Freq 1.000000000 GHz
-31.1 -41.1										×1	CF Step 97.000000 MHz <u>Auto</u> Man
-51.1	ward ywał	htyfyrydai ynaityr	unter and apply the	n ruhandha-ndithach	huldh un maland	had all have a second	_{henre} atadinakai	l where and	ntradipersonality	Anton Martin and Anton	Freq Offset 0 Hz
	t 30.0 ľ									0000 GHz	
	s BW 1	.0 MHz		#VBW	3.0 MHz	*				(1000 pts)	<u> </u>
MSG								STATU	IS 🐼 Align N	low, All requi	red

(Plot 4.5.1 A3: Channel 9262: 1852.4MHz @ Traffic WCDMA Band II)

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	ectrum Analyzer - Swept SA								
	RF 50 Ω AC r Freq 4.000000000		SEN	NSE:INT	Avg Type	ALIGN OFF		M Sep 06, 2015	Frequency
Cente	TTeq 4.00000000	PNO: Fast IFGain:Low	Trig: Free #Atten: 40		Avg Hold:		TYF		
10 dB/di	Ref Offset 8.9 dB					M	(r2 3.64) -31.6	l 4 GHz 49 dBm	Auto Tune
20.0 —									Center Freq 4.000000000 GHz
0.00									Start Freq 1.000000000 GHz
-10.0 -20.0								-13.00 dBm	Stop Freq 7.000000000 GHz
-30.0		ak and a star of a st					de Deselverberte de Althique	nana dadi baga bar Mana dadi baga bar	CF Step 600.000000 MHz <u>Auto</u> Man
-50.0									Freq Offset 0 Hz
-60.0									
	.000 GHz W 1.0 MHz	#VBW	3.0 MHz*	;		Sweep	Stop / 10.3 ms (.000 GHz 6200 pts)	
MSG						STATU	s 🕄 Align N	ow, All requi	red



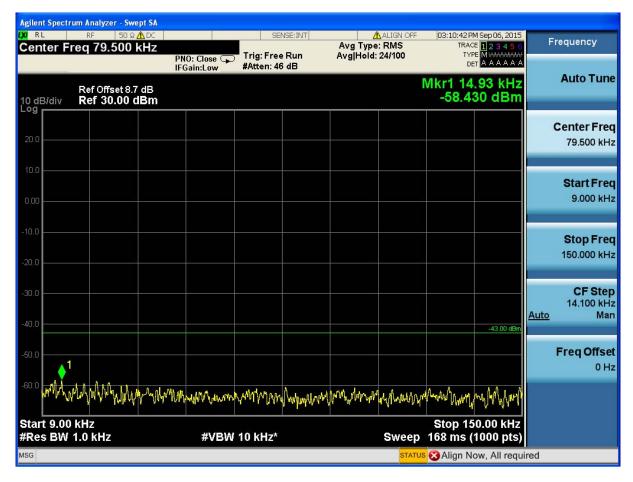


(Plot 4.5.1 A5: Channel 9262: 1852.4MHz @ Traffic WCDMA Band II)

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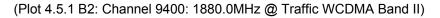
		m Analyzer - Sw	vept SA								
LXI RI		RF 50 Ω		SU	SE	NSE:INT	Avg Type			M Sep 06, 2015	Frequency
Cen	ter Fr	eq 16.800		NO: Fast 😱	Trig: Free		Avg Hold:		TY	E M WWWWWW	
	_		IF	Gain:Low	#Atten: 30) dB	1.000				Auto Tuno
		Ref Offset 8.	9 dB					Mki	1 17.36	56GHz	Auto Tune
10 dE Log	3/div	Ref 28.90	dBm						-37.1	60 dBm	
LUG											
18.9		9	9	4					90	8	Center Freq
10.0											16.80000000 GHz
8.90											
0.00											Start Freq
-1.10			9	4					4		13.60000000 GHz
-11.1				5						-13.00 dBm	
											Stop Freq
-21.1			9	e.					4) 	-	20.00000000 GHz
-31.1							1				CF Step
											640.000000 MHz Auto Man
-41.1		والمأتية والمادر والمرد أكتريها			a photon of a payment of					this is a string of the	<u>Auto</u> Man
		A LINE OF STREET		and the second	Billing strates that will						and strength and
-51.1											Freq Offset
											0 Hz
-61.1											
Star	L 13.60	0 GHz							Stop 20	.000 GHz	
		.0 MHz		#VBW	3.0 MHz	*		Sweep	16.2 ms (6400 pts)	
MSG									-	ow, All requi	red
											August .

(Plot 4.5.1 A6: Channel 9262: 1852.4MHz @ Traffic WCDMA Band II)



(Plot 4.5.1 B1: Channel 9400: 1880.0MHz @ Traffic WCDMA Band II)

		um Analy											
Cent	14 M	_{RF} rea 15	50 Ω		7	SE	NSE:INT	Avg Type		TRAG	M Sep 06, 2015	F	requency
					PNO: Wide G IFGain:Low	Trig: Fre #Atten: 4		Avg Hold:	12/100	D			Auto Tune
10 dE Log r	3/div		fset 8.7 0.00 d							Mkr1 - 62.0	419 kHz 42 dBm		Autorune
20.0					<i></i>								Center Freq 5.075000 MHz
10.0 e													Start Freq 150.000 kHz
-10.0												3	Stop Freq 0.000000 MHz
-30.0 -											-33.00 dBm	Auto	CF Step 2.985000 MHz Man
-40.0 -50.0	. 1												Freq Offset 0 Hz
-60.0	1.44mm	multip	mningerful	whyppelth	artained laboration	mpralywww	hyunyeluluinnely	www.marly.day.day.day	ujurty ant	Halipheliner	Anthy Lapla Proder		
	t 150 s BW	kHz 10 kHz			#VB\	№ 30 kHz*			Sweep		0.00 MHz 1000 pts)		
MSG									STATUS	🛛 🕄 Align N	ow, All requi	red	





(Plot 4.5.1 B3: Channel 9400: 1880.0MHz @ Traffic WCDMA Band II)

	t Spectrum											
Cen		RF a 4 0	50 Ω	AC	17	SE	NSE:INT	Avg Type	ALIGN OFF	TRA	M Sep 06, 2015	Frequency
		9 110		Р	NO: Fast 🖵 Gain:Low	Trig: Fre #Atten: 4		Avg Hold:	86/100	TY D	PE MWWWWWW ET A A A A A A	_
					3am.2000				M	(r2 3.65	2 0 GHz	Auto Tune
10 dE		tef Offs tef 30								-31.6	40 dBm	
Log			<u>∖1</u>									Center Freq
20.0										8	4	4.000000000 GHz
and a constant												
10.0					<u> </u>							Start Freq
0.00					6					2	e e	1.000000000 GHz
-10.0											-13.00 dBm	Stop Freq
-20.0												7.00000000 GHz
-20.0						-						
-30.0		-				• ²						CF Step
		a a seconda	الملادين	والمتعالية المتعالية	a julia li tri sala ju	d and the state of						600.000000 MHz <u>Auto</u> Man
-40.0			(Lunderse)					وتغاكلت عبري الكالتقار				
-50.0										-		Freq Offset
												0 Hz
-60.0										-	2	
	t 1.000 Q								_		.000 GHz	
	s BW 1.0	UTIVIHZ	2		#VBW	3.0 MHz	•				(6200 pts)	
MSG		_							STATU	Align	low, All requi	rea

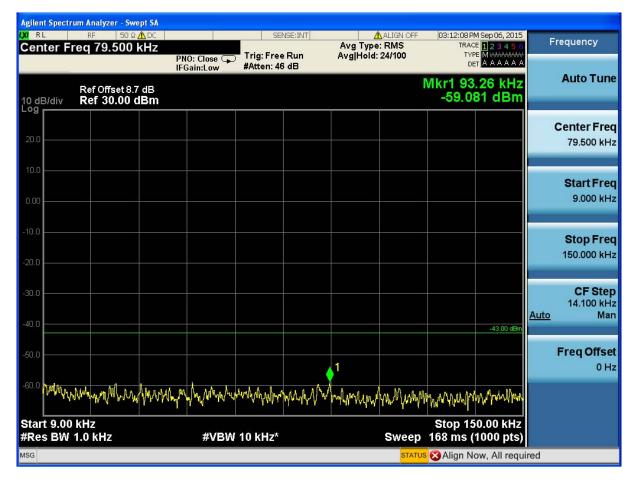




(Plot 4.5.1 B5: Channel 9400: 1880.0MHz @ Traffic WCDMA Band II)

		m Analyzer - Sw	rept SA								
LXI RL		RF 50 Ω			SE	NSE:INT	Avg Type	ALIGN OFF		M Sep 06, 2015	Frequency
Cen	ler Fr	eq 16.800		NO: Fast 🗔	Trig: Free		Avg Hold:		TY	PE M WARANA	
	_			Gain:Low	#Atten: 30) dB	1.042			ET A A A A A A	Auto Tuno
		Ref Offset 8.	9 dB					Mki	1 18.88	5 8 GHz	Auto Tune
10 dE Log	3/div	Ref 28.90	dBm						-37.2	05 dBm	
LUG											
18.9				.e.							Center Freq
10.3											16.80000000 GHz
8.90											
0.00											Start Freq
-1.10			2	15	2				5	2	13.60000000 GHz
-11.1				-					-	-13.00 dBm	
										10.00 0011	Stop Freq
-21.1			2	5					4	ę	20.00000000 GHz
-31.1											CF Step
									`♦ '		640.000000 MHz
-41.1		a dia manandra si	three dealers in the stand		a la la la mana a super de la	-			New Webser	and the second second	<u>Auto</u> Man
				and the strength of	to be particular to the					States of the state of the stat	
-51.1	9.3										Freq Offset
											0 Hz
-61.1											
Ctar	+ 12 6(0 GHz							Stop 20	.000 GHz	
		.0 MHz		#VBW	3.0 MHz	*		Sweep	16.2 ms (6400 GH2	
MSG										ow, All requi	red
	_							Child		on, Airiequi	iou -





(Plot 4.5.1 C1: Channel 9538: 1907.6MHz @ Traffic WCDMA Band II)

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Agilent Spectrum Analyzer - Sv	wept SA				
	Ω 🚹 DC	SENSE:INT	ALIGN OFF	03:12:29 PM Sep 06, 2015	Frequency
Center Freq 15.075	PNO: Wide 🗔	Trig: Free Run	Avg Type: RMS Avg Hold: 12/100	TRACE 1 2 3 4 5 6 TYPE M WWWWWW	
	IFGain:Low	#Atten: 40 dB			
Ref Offset 8 10 dB/div Ref 30.00				Mkr1 150 kHz -61.150 dBm	Auto Tune
10 dB/div Ref 30.00					
					Center Freq
20.0	<u>e</u>				15.075000 MHz
10.0					
					Start Freq
0.00	8				150.000 kHz
-10.0	- 				Stop Freq
					30.000000 MHz
-20.0					
-30.0				-33.00 dBm	CF Step 2.985000 MHz
					Auto Man
-40.0					
26.3					Freq Offset
-50.0					0 Hz
1					0112
-60.0	the phane in the second	hadrowning	attown with the the the the the the the the the t	handapatan	
Start 150 kHz				Stop 30.00 MHz	
#Res BW 10 kHz	#VBW	/ 30 kHz*	Sweep	368 ms (1000 pts)	
MSG			STATUS	Align Now, All requi	red

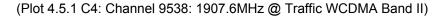
(Plot 4.5.1 C2: Channel 9538: 1907.6MHz @ Traffic WCDMA Band II)

-		m Analyzer					42				
Cen			50 Ω AC DOOOOO MH	lz		NSE:INT	Avg Type		TRA	M Sep 06, 2015	Frequency
			I	PNO: Fast 😱 FGain:Low) Trig: Free #Atten: 30		Avg Hold		۲۷ D Wkr1 87		Auto Tune
10 dI		Ref Offse Ref 28.9							-46.0	19 dBm	
Log 18.9				2	-				G.		Center Freq 515.000000 MHz
8.90											
-1.10						-					Start Freq 30.000000 MHz
-11.1										-13.00 dBm	Stop Freq 1.000000000 GHz
-31.1											CF Step 97.000000 MHz
-41.1									1		<u>Auto</u> Man
-51.1	rinadauni	mouthing	www.worldwalapse	manunant	monorpulation	120 Mary porto from	htyllightermine	๛๚๛๛๚๛	ntrally and the	At diwind me have the	Freq Offset
-61.1											0 Hz
-01.1											
	t 30.0 I									0000 GHz	
	s BW 1	.0 MHz		#VBW	3.0 MHz	*			1.20 ms (
MSG								STATU	S 🛛 Align N	ow, All requi	red

(Plot 4.5.1 C3: Channel 9538: 1907.6MHz @ Traffic WCDMA Band II)

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		ım Analyzer -	Swept SA								
LXI RI	1.1.1		Ω AC	CHI	SE	NSE:INT	Avg Type			M Sep 06, 2015	Frequency
Cen	ler Fr	eq 4.000	000000	PNO: Fast 😱	Trig: Free		Avg Hold:		TY		
	_			IFGain:Low	#Atten: 40) dB					Auto Tune
		Ref Offset	8.9 dB					MI	kr2 3.67	2 4 GHz	Auto Tune
10 dE	3/div	Ref 30.00) dBm						-31.2	36 dBm	
Log		. 1									Conton Enor
20.0				С <u>с</u>						C.	Center Freq
22.2											4.00000000 GHz
10.0									_		
											Start Freq
0.00				6						c	1.00000000 GHz
-10.0									_	10.00.10	
										-13.00 dBm	Stop Freq
-20.0				e .					9	-	7.00000000 GHz
					. 2						
-30.0					_				5	~	CF Step
					and the state	وعالمه اصلامه الم	والانتخاص والمتعادين		and the state of the	Mada Mijaka da Ali	600.000000 MHz
-40.0	الدارية أرجل				Varianti Carat	a banalanda	And the state of t	A Statistic Barrier Barrier			<u>Auto</u> Man
	Contraction of the local division of the loc	111									
-50.0			-								Freq Offset
											0 Hz
-60.0											
Star	t 1.000								Stop 7	.000 GHz	
		1.0 MHz		#VBW	3.0 MHz	*		Sweep	10.3 ms (6200 pts)	
MSG									-	ow, All requi	red
									angir it	on, mirequi	





(Plot 4.5.1 C5: Channel 9538: 1907.6MHz @ Traffic WCDMA Band II)



(Plot 4.5.1 C6: Channel 9538: 1907.6MHz @ Traffic WCDMA Band II)

4.6.2 For UMTS/TM1/WCDMA Band V Test Results

A. Test Verdict

Test Mode/ Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBm)	Verdict
		9KHz-150KHz	Plot 4.5.2 A1	-13.00	PASS
UMTS/TM1/WCDMA		150KHz-30MHz	Plot 4.5.2 A2	-13.00	PASS
Band V/4132	826.40	30MHz-1GHz	Plot 4.5.2 A3	-13.00	PASS
Barlu V/4132		1GHz-7GHz	Plot 4.5.2 A4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.2 A5	-13.00	PASS
		9KHz-150KHz	Plot 4.5.2 B1	-13.00	PASS
UMTS/TM1/WCDMA		150KHz-30MHz	Plot 4.5.2 B2	-13.00	PASS
Band V/4183	836.60	30MHz-1GHz	Plot 4.5.2 B3	-13.00	PASS
Ballu V/4103		1GHz-7GHz	Plot 4.5.2 B4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.2 B5	-13.00	PASS
		9KHz-150KHz	Plot 4.5.2 C1	-13.00	PASS
		150KHz-30MHz	Plot 4.5.2 C2	-13.00	PASS
UMTS/TM1/WCDMA	846.60	30MHz-1GHz	Plot 4.5.2 C3	-13.00	PASS
Band V/4233	040.00	1GHz-7GHz	Plot 4.5.2 C4	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.2 C5	-13.00	PASS
		7GHz-13.6GHz	Plot 4.5.2 D5	-13.00	PASS

Note:

1. In general, the worse case attenuation requirement shown above was applied.

2."---" means that the emission level is too low to be measured or at least 20 dB down than the limit.

B. Test Plots

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(Plot 4.5.2 A1: Channel 4132: 826.40 MHz @ WCDMA Band V)

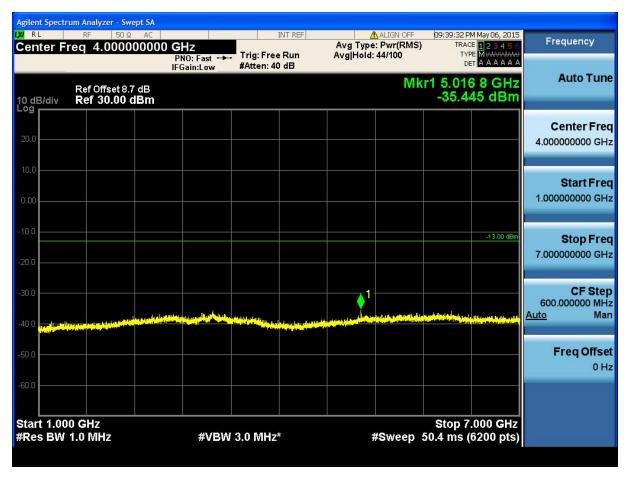
enter F	RF 50 Ω req 15.075		Z NO: Fast 🔸	. Trig: Free			ALIGN OFF : Pwr(RMS) 100/100	TRACE	May 06, 2015 1 2 3 4 5 6 M M M M M M M M M M M M M M M M M M M	Frequency
) dB/div	Ref Offset 7. Ref 27.41	41 dB	Gain:Low	#Atten: 30) dB			Mkr1 1		Auto Tur
7.4										Center Fre 15.075000 Mi
59 										Start Fr 150.000 ki
2.6										Stop Fr 30.000000 M
2.6									-33.00 dBm	CF St 2.985000 M <u>Auto</u> M
.6										Freq Offs 0
tart 150 Res BW		Auk Uniprov	#VBM		Martin policity	n all and him all	hul pilyyyyy #Sweep 5	Stop 30	000 pts)	

(Plot 4.5.2 A2: Channel 4132: 826.40 MHz @ WCDMA Band V)

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		um Analyzer - S									
LXI RI		RF 50				INT REF		ALIGN OFF : Pwr(RMS)		M May 06, 2015 E 1 2 3 4 5 6	Frequency
Cen	ler F	req 515.0	00000	PNO: Fast +++	Trig: Free		Avg Hold:		TYF		
_				IFGain:Low	#Atten: 30	dB		_			Auto Tune
10 dE Log	3/div	Ref Offset 8 Ref 28.05						N	-51.7	1.5 MHz 82 dBm	Auto Fullo
Lvg									. 1		Center Freq
18.1									? '		515.000000 MHz
8.05											Ctort Eron
4.05						-					Start Freq 30.000000 MHz
-1.95											00.000000 mil 12
-12.0										-13.00 dBm	
											Stop Freq
-22.0									$\left \right $		1.000000000 GHz
											07.04
-32.0											CF Step 97.000000 MHz
-42.0											<u>Auto</u> Man
42.0										2	
-52.0			and an allowed and	and a sugar lag to some any	and shared a			ويعدد ومعالية والمعالية ومعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية			Freq Offset
											0 Hz
-62.0											
	t 30.0								Stop 1.0	0000 GHz	
#Re:	s BW	1.0 MHz		#VBW	3.0 MHz	*	7	#Sweep	50.0 ms (1000 pts)	4

(Plot 4.5.2 A3: Channel 4132: 826.40 MHz @ WCDMA Band V)



(Plot 4.5.2 A4: Channel 4132: 826.40 MHz @ WCDMA Band V)

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Ref Offset 9.74 dB MKFT 12.009 T GH2 10 dB/div Ref 29.74 dBm -45.067 dBm 19.7	Tune Freq
Ref Offset 9.74 dB Mkr1 12.669 1 GHz Auto 10 dB/div Ref 29.74 dB Center Center	Tune Freq
IFGain:Low #Atten: 30 dB Def # A A A A A Ref Offset 9.74 dB Mkr1 12.669 1 GHz -45.067 dBm Auto 10 dB/div Ref 29.74 dB Center 19.7 0.74 0.00000000000000000000000000000000000	Freq
Ref Offset 9.74 dB MKFT 12.009 T GH2 10 dB/div Ref 29.74 dBm -45.067 dBm 19.7	Freq
10 dB/div Ref 29.74 dBm -45.067 dBm 19.7	
19.7 9.74	
9.74	
9.74	0 GHz
	Freq
-0.26 7.0000000	
-10.3	
-10.0	Freq
-20.3	0 GHz
-30.3	Step
660.0000	0 MHz
-40.3	Man
	Offset
	0 Hz
-60.3	
Start 7.000 GHz Stop 13.600 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* #Sweep 50.3 ms (6800 pts)	

(Plot 4.5.2 A5: Channel 4132: 826.40 MHz @ WCDMA Band V)



(Plot 4.5.2 B1: Channel 4183: 836.60 MHz @ WCDMA Band V)