

# RF TEST REPORT



Report No.: 16071169-FCC-R1

Supersede Report No.: N/A

Applicant	Juniper Systems Inc		
Product Name	4G Tablet PC		
Model No.	CT7G		
Serial No.	N/A		
Test Standard	FCC Part 22(H):2015 ;FCC Part 24(E):2015; ANSI/TIA-603-D: 2010		
Test Date	September 21 to October 24, 2016		
Issue Date	October 25, 2016		
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		
Equipment complied with the specification <input checked="" type="checkbox"/>			
Equipment did not comply with the specification <input type="checkbox"/>			
Loren Luo	David Huang		
Loren Luo Test Engineer	David Huang Checked By		
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Test result presented in this test report is applicable to the tested sample only			

Issued by:

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## Laboratories Introduction

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### Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
16071169-FCC-R1	NONE	Original	October 25, 2016

## 2. Customer information

Applicant Name	Juniper Systems Inc
Applicant Add	1132W 1700N, Logan, Utah 84321,United States
Manufacturer	Juniper Systems Inc
Manufacturer Add	1132W 1700N, Logan, Utah 84321,United States

## 3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

#### 4. Equipment under Test (EUT) Information

Description of EUT: 4G Tablet PC

Main Model: CT7G

Serial Model: N/A

Date EUT received: September 20, 2016

Test Date(s): September 21 to October 24, 2016

Equipment Category : PCE

Antenna Gain:  
 GSM850: 1.5dBi  
 PCS1900: 1.5dBi  
 UMTS-FDD Band V:1.5dBi  
 UMTS-FDD Band II:1.5dBi  
 LTE Band IV:1.5dBi  
 LTE Band V: 1.5dBi  
 LTE Band VII: 1.5dBi  
 LTE Band XVII: 1.5dBi  
 Bluetooth/BLE/WIFI:1.5dBi  
 GPS:1.5dBi

Antenna Type: PIFA antenna

Type of Modulation:  
 GSM / GPRS: GMSK  
 EGPRS: GMSK,8PSK  
 UMTS-FDD: QPSK  
 LTE Band: QPSK, 16QAM  
 802.11b/g/n: DSSS, OFDM  
 Bluetooth: GFSK, π /4DQPSK, 8DPSK  
 BLE: GFSK  
 GPS:BPSK

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GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz  
 PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz  
 UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz  
 UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;  
 RX: 1932.4 ~ 1987.6 MHz

RF Operating Frequency (ies):  
 LTE Band IV TX: 1710.7 ~ 1754.3 MHz; RX : 2110.7 ~ 2154.3 MHz  
 LTE Band V TX: 826.5 ~ 846.5 MHz; RX : 871.5 ~ 891.5 MHz  
 LTE Band VII TX: 2502.5 ~ 2567.5 MHz; RX : 2622.5 ~ 2687.5 MHz  
 LTE Band XVII TX: 706.5 ~ 713.5 MHz; RX : 736.5 ~ 743.5 MHz  
 WIFI: 802.11b/g/n(20M): 2412-2462 MHz  
 WIFI: 802.11n(40M): 2422-2452 MHz  
 Bluetooth& BLE: 2402-2480 MHz  
 GPS: 1575.42 MHz

GSM Vioce:GSM850: 28.78 dBm  
 PCS1900: 24.85 dBm  
 GPRS:GSM850: 28.74 dBm  
 PCS1900: 24.83 dBm  
 EGPRS(MCS1):GSM850: 28.58 dBm  
 PCS1900: 24.81 dBm

Maximum Conducted  
 AV Power to Antenna:  
 RMC:UMTS-FDD Band V: 18.64 dBm  
 UMTS-FDD Band II: 16.84 dBm  
 HSUPA:UMTS-FDD Band V: 17.85 dBm  
 UMTS-FDD Band II: 15.86 dBm  
 HSDPA:UMTS-FDD Band V: 17.87 dBm  
 UMTS-FDD Band II: 15.79 dBm

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GSM Vioce:GSM850: 28.09 dBm / ERP

PCS1900: 26.24 dBm / EIRP

GPRS:GSM850: 28.22 dBm / ERP

PCS1900: 26.15 dBm / EIRP

EGPRS(MCS5):GSM850: 20.28 dBm / ERP

ERP/EIRP: PCS1900: 22.48 dBm / EIRP

RMC:UMTS-FDD Band V: 18.03 dBm / ERP

UMTS-FDD Band II: 18.32 dBm / EIRP

HSDPA:UMTS-FDD Band V: 17.42 dBm / ERP

UMTS-FDD Band II: 17.31 dBm / EIRP

HSUPA:UMTS-FDD Band V: 17.45 dBm / ERP

UMTS-FDD Band II: 17.37 dBm / EIRP

GSM 850: 124CH

PCS1900: 299CH

UMTS-FDD Band V: 102CH

UMTS-FDD Band II: 277CH

Number of Channels: WIFI :802.11b/g/n(20M): 11CH

WIFI :802.11n(40M): 7CH

Bluetooth: 79CH

BLE: 40CH

GPS:1CH

Port: USB Port, Earphone Port

Input Power: Battery:

Spec: 3.7V

Trade Name : Cedar

GPRS/ EGPRS Multi-slot class 8/10/12

FCC ID: VSFCT7G

## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§ 1.1307; § 2.1093	RF Exposure (SAR)	Compliance
§2.1046; § 22.913(a); § 24.232(c); § 27.50(c.10) ;	RF Output Power	Compliance
§ 24.232 (d) ;	Peak-Average Ratio	Compliance
§ 2.1049; § 22.905; § 22.917; § 24.238;	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a);	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a);	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a);	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235;	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

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

### Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

## **6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS**

### **6.1 RF Exposure (SAR)**

Test Result: Pass

The EUT is a portable device, thus requires SAR evaluation;

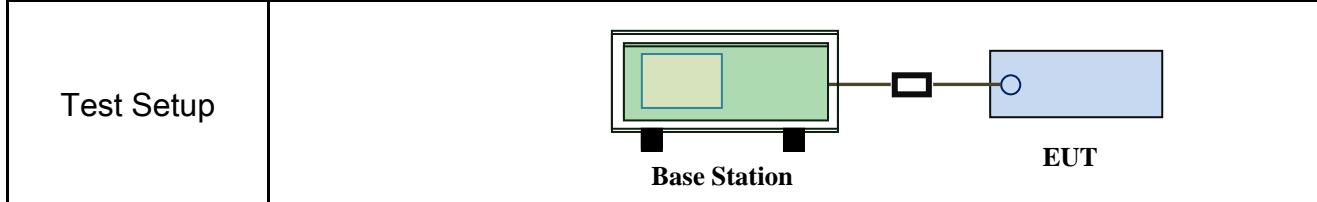
Please refer to RF Exposure Evaluation Report: 16071169-FCC-H.

## 6.2 RF Output Power

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.913 (a)	a)	ERP:38.45dBm	<input checked="" type="checkbox"/>
§24.232 (c)	b)	EIRP:33dBm	<input checked="" type="checkbox"/>



<b>Test Procedure</b>	<p>For Conducted Power:</p> <ul style="list-style-type: none"> <li>- The transmitter output port was connected to base station.</li> <li>- Set EUT at maximum power through base station.</li> <li>- Select lowest, middle, and highest channels for each band and different test mode.</li> </ul> <p>For ERP/EIRP:</p> <p>According with KDB 971168 v02r02</p> <ul style="list-style-type: none"> <li>- The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>- The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>- The frequency range up to tenth harmonic of the fundamental frequency was investigated.</li> </ul>

	<ul style="list-style-type: none"> <li>- Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</li> <li>- Spurious emissions in dB = <math>10 \log (\text{TX power in Watts}/0.001)</math> – the absolute level</li> <li>- Spurious attenuation limit in dB = <math>43 + 10 \log_{10} (\text{power out in Watts})</math>.</li> </ul>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data     Yes       N/A

Test Plot     Yes (See below)       N/A

## Conducted Power

### GSM Mode:

Burst Average Power (dBm);								
Band	GSM850				PCS1900			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice (1 uplink),GMSK	<b>28.78</b>	28.50	28.62	28.5±1	24.40	<b>24.85</b>	24.77	24.5±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	<b>28.74</b>	28.50	28.61	28.5±1	24.37	<b>24.83</b>	24.74	24.5±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	27.85	27.89	27.94	27.5±1	23.55	24.29	24.40	24±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	27.82	27.8	27.87	27.5±1	23.47	24.18	24.31	24±1
EGPRS Multi-Slot Class 8 (1 uplink) GMSK MCS1	<b>28.58</b>	28.50	28.47	28.5±1	24.34	<b>24.81</b>	24.68	24.5±1
EGPRS Multi-Slot Class 10 (2 uplink) GMSK MCS1	27.85	27.88	27.93	27.5±1	23.49	24.22	24.40	24±1
EGPRS Multi-Slot Class 12 (4 uplink) GMSK MCS1	27.81	27.80	27.87	27.5±1	23.42	24.17	24.28	24±1
EGPRS Multi-Slot Class 8 (1 uplink) 8PSK MCS5	<b>20.85</b>	20.76	20.81	20.5±1	19.48	20.40	<b>21.07</b>	20.3±1
EGPRS Multi-Slot Class 10 (2 uplink) 8PSK MCS5	19.74	19.97	19.73	19.5±1	18.58	19.65	20.38	19.5±1
EGPRS Multi-Slot Class 12 (4 uplink) 8PSK MCS5	16.70	16.46	16.39	16.5±1	15.71	16.48	17.06	16.3±1

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Remark :

GPRS, CS1 coding scheme.

EGPRS, MCS1 coding scheme.

EGPRS, MCS5 coding scheme.

Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link

Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link

Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link

## UMTS Mode:

### UMTS-FDD Band V

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
RMC 12.2kbps	4132	826.4	18.51	18±1
	4175	835	<b>18.64</b>	18±1
	4233	846.6	18.46	18±1
HSDPA Subtest1	4132	826.4	17.81	17.5±1
	4175	835	17.76	17.5±1
	4233	846.6	17.83	17.5±1
HSDPA Subtest2	4132	826.4	17.82	17.5±1
	4175	835	17.79	17.5±1
	4233	846.6	17.81	17.5±1
HSDPA Subtest3	4132	826.4	<b>17.85</b>	17.5±1
	4175	835	17.79	17.5±1
	4233	846.6	17.74	17.5±1
HSDPA Subtest4	4132	826.4	17.73	17.5±1
	4175	835	17.77	17.5±1
	4233	846.6	17.72	17.5±1
HSUPA Subtest1	4132	826.4	17.80	17.5±1
	4175	835	17.85	17.5±1
	4233	846.6	17.83	17.5±1
HSUPA Subtest2	4132	826.4	17.81	17.5±1
	4175	835	17.82	17.5±1
	4233	846.6	17.86	17.5±1
HSUPA Subtest3	4132	826.4	17.72	17.5±1
	4175	835	17.74	17.5±1
	4233	846.6	17.76	17.5±1
HSUPA Subtest4	4132	826.4	17.72	17.5±1
	4175	835	17.75	17.5±1
	4233	846.6	17.71	17.5±1
HSUPA Subtest5	4132	826.4	17.76	17.5±1
	4175	835	<b>17.87</b>	17.5±1
	4233	846.6	17.80	17.5±1

## UMTS-FDD Band II

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
RMC 12.2kbps	9262	1852.4	16.69	16±1
	9400	1880	16.47	16±1
	9538	1907.6	<b>16.84</b>	16±1
HSDPA Subtest1	9262	1852.4	15.68	15.5±1
	9400	1880	15.59	15.5±1
	9538	1907.6	15.73	15.5±1
HSDPA Subtest2	9262	1852.4	<b>15.86</b>	15.5±1
	9400	1880	15.64	15.5±1
	9538	1907.6	15.69	15.5±1
HSDPA Subtest3	9262	1852.4	15.74	15.5±1
	9400	1880	15.63	15.5±1
	9538	1907.6	15.61	15.5±1
HSDPA Subtest4	9262	1852.4	15.79	15.5±1
	9400	1880	15.71	15.5±1
	9538	1907.6	15.72	15.5±1
HSUPA Subtest1	9262	1852.4	15.64	15.5±1
	9400	1880	15.70	15.5±1
	9538	1907.6	15.64	15.5±1
HSUPA Subtest2	9262	1852.4	15.62	15.5±1
	9400	1880	15.69	15.5±1
	9538	1907.6	15.73	15.5±1
HSUPA Subtest3	9262	1852.4	<b>15.79</b>	15.5±1
	9400	1880	15.71	15.5±1
	9538	1907.6	15.72	15.5±1
HSUPA Subtest4	9262	1852.4	15.74	15.5±1
	9400	1880	15.73	15.5±1
	9538	1907.6	15.69	15.5±1
HSUPA Subtest5	9262	1852.4	15.68	15.5±1
	9400	1880	15.62	15.5±1
	9538	1907.6	15.62	15.5±1

## ERP & EIRP

### GSM Voice

#### ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	21.82	V	6.8	0.53	<b>28.09</b>	38.45
824.2	20.07	H	6.8	0.53	26.34	38.45
836.6	21.58	V	6.8	0.53	27.85	38.45
836.6	19.84	H	6.8	0.53	26.11	38.45
848.8	21.6	V	6.9	0.53	27.97	38.45
848.8	19.98	H	6.9	0.53	26.35	38.45

#### EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	18.89	V	7.88	0.85	25.92	33
1850.2	17.63	H	7.88	0.85	24.66	33
1880	19.21	V	7.88	0.85	<b>26.24</b>	33
1880	18.03	H	7.88	0.85	25.06	33
1909.8	19.07	V	7.86	0.85	26.08	33
1909.8	17.84	H	7.86	0.85	24.85	33

**GPRS:**
**ERP for Cellular Band (Part 22H)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	21.78	V	6.8	0.53	28.05	38.45
824.2	20.03	H	6.8	0.53	26.30	38.45
836.6	21.64	V	6.8	0.53	27.91	38.45
836.6	19.95	H	6.8	0.53	26.22	38.45
848.8	21.85	V	6.9	0.53	<b>28.22</b>	38.45
848.8	20.26	H	6.9	0.53	26.63	38.45

**EIRP for PCS Band (Part 24E)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	18.86	V	7.88	0.85	25.89	33
1850.2	17.51	H	7.88	0.85	24.54	33
1880	19.12	V	7.88	0.85	<b>26.15</b>	33
1880	17.82	H	7.88	0.85	24.85	33
1909.8	19.03	V	7.86	0.85	26.04	33
1909.8	17.71	H	7.86	0.85	24.72	33

**EGPRS (MCS5):**
**ERP for Cellular Band (Part 22H)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	13.95	V	6.8	0.53	20.22	38.45
824.2	12.87	H	6.8	0.53	19.14	38.45
836.6	13.82	V	6.8	0.53	20.09	38.45
836.6	12.7	H	6.8	0.53	18.97	38.45
848.8	13.91	V	6.9	0.53	<b>20.28</b>	38.45
848.8	12.83	H	6.9	0.53	19.20	38.45

**EIRP for PCS Band (Part 24E)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	13.94	V	7.88	0.85	20.97	33
1850.2	12.75	H	7.88	0.85	19.78	33
1880	14.87	V	7.88	0.85	21.90	33
1880	13.62	H	7.88	0.85	20.65	33
1909.8	15.47	V	7.86	0.85	<b>22.48</b>	33
1909.8	13.99	H	7.86	0.85	21.00	33

**RMC**
**ERP for UMTS-FDD Band V (Part 22H)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	11.68	V	6.8	0.53	17.95	38.45
826.4	10.92	H	6.8	0.53	17.19	38.45
835	11.76	V	6.8	0.53	<b>18.03</b>	38.45
835	10.98	H	6.8	0.53	17.25	38.45
846.6	11.59	V	6.9	0.53	17.96	38.45
846.6	10.83	H	6.9	0.53	17.20	38.45

**EIRP for UMTS-FDD Band II (Part 24E)**

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	11.19	V	7.88	0.85	18.22	33
1852.4	10.03	H	7.88	0.85	17.06	33
1880	10.98	V	7.88	0.85	18.01	33
1880	9.86	H	7.88	0.85	16.89	33
1907.6	11.31	V	7.86	0.85	<b>18.32</b>	33
1907.6	10.13	H	7.86	0.85	17.14	33

## HSDPA

### ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	10.97	V	6.8	0.53	17.24	38.45
826.4	10.1	H	6.8	0.53	16.37	38.45
835	10.89	V	6.8	0.53	17.16	38.45
835	9.95	H	6.8	0.53	16.22	38.45
846.6	11.05	V	6.9	0.53	<b>17.42</b>	38.45
846.6	10.22	H	6.9	0.53	16.59	38.45

### EIRP for UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	10.19	V	7.88	0.85	17.22	33
1852.4	9.03	H	7.88	0.85	16.06	33
1880	9.97	V	7.88	0.85	17.00	33
1880	8.85	H	7.88	0.85	15.88	33
1907.6	10.3	V	7.86	0.85	<b>17.31</b>	33
1907.6	9.13	H	7.86	0.85	16.14	33

## HSUPA

### ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	10.95	V	6.8	0.53	17.22	38.45
826.4	10.11	H	6.8	0.53	16.38	38.45
835	10.92	V	6.8	0.53	17.19	38.45
835	10.05	H	6.8	0.53	16.32	38.45
846.6	11.08	V	6.9	0.53	<b>17.45</b>	38.45
846.6	10.24	H	6.9	0.53	16.61	38.45

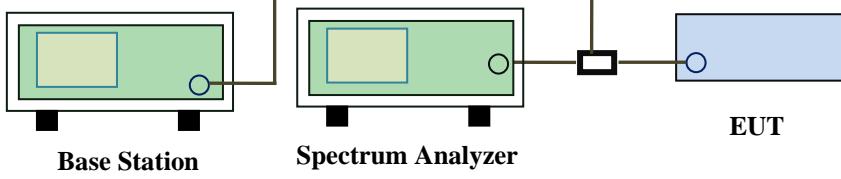
### EIRP for UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	10.13	V	7.88	0.85	17.16	33
1852.4	9.07	H	7.88	0.85	16.10	33
1880	10.04	V	7.88	0.85	17.07	33
1880	8.97	H	7.88	0.85	16.00	33
1907.6	10.36	V	7.86	0.85	<b>17.37</b>	33
1907.6	9.23	H	7.86	0.85	16.24	33

### 6.3 Peak-Average Ratio

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§24.232(d)	a)	The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.	<input checked="" type="checkbox"/>
Test Setup	 <b>Base Station</b> <b>Spectrum Analyzer</b> <b>EUT</b>		
Test Procedure	<p>According with KDB 971168 v02r02</p> <p><b>5.7.2 Alternate procedure for PAPR</b></p> <p><b>5.1.2 Peak power measurements with a peak power meter</b></p> <p>The total peak output power may be measured using a broadband peak RF power meter. The power meter must have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.</p> <p><b>5.2.3 Average power measurement with average power meter</b></p> <p>As an alternative to the use of a spectrum/signal analyzer or EMI receiver to perform a measurement of the total in-band average output power, a wideband RF average power meter with a thermocouple detector or equivalent can be used under certain conditions</p> <p>If the EUT can be configured to transmit continuously (i.e., the burst duty cycle <math>\geq 98\%</math>) and at all times the EUT is transmitting at its maximum output</p>		

	<p>power level, then a conventional wide-band RF power meter can be used.</p> <p>If the EUT cannot be configured to transmit continuously (i.e., the burst duty cycle &lt; 98%), then there are two options for the use of an average power meter. First, a gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only over active transmission bursts at maximum output power levels. A conventional average power meter can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to <math>10\log(1/\text{duty cycle})</math></p>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data     Yes       N/A

Test Plot     Yes (See below)       N/A

**GSM : GSM 1900 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	26.70	24.4	2.30
1880	26.88	24.83	2.05
1909.8	26.94	24.77	2.17

**GPRS 1900 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	26.28	24.37	1.91
1880	26.19	24.83	1.36
1909.8	26.46	24.74	1.72

**EGPRS (MSC5) 1900 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	20.83	19.48	1.35
1880	21.17	20.4	0.77
1909.8	23.56	21.07	2.49

**RMC : UMTS-FDD Band 2 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	17.24	16.69	0.55
1880	16.94	16.47	0.47
1907.6	17.09	16.48	0.61

**HSDPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	16.80	15.68	1.12
1880	16.93	15.59	1.34
1907.6	16.97	15.73	1.24

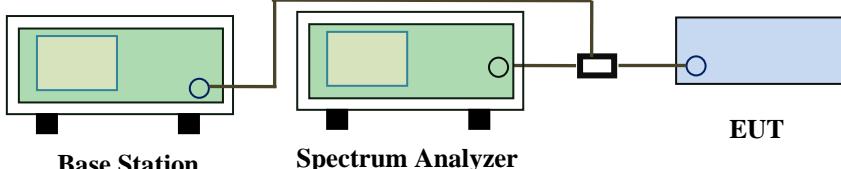
**HSUPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	17.04	15.64	1.40
1880	17.1	15.7	1.40
1907.6	16.55	15.64	0.91

## 6.4 Occupied Bandwidth

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1049, §22.917, §22.905 §24.238	a)	99% Occupied Bandwidth(kHz)	<input checked="" type="checkbox"/>
	b)	26 dB Bandwidth(kHz)	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;"><b>Base Station</b>      <b>Spectrum Analyzer</b>      <b>EUT</b></p>		
Test Procedure	<ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.</li> </ul>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

**GSM Voice:**
**Cellular Band (Part 22H) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	250.05	319.9
190	836.6	249.99	319.0
251	848.8	251.88	318.6

**PCS Band (Part 24E) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	248.89	321.2
661	1880.0	247.34	321.1
810	1909.8	249.47	319.4

**GPRS:**
**Cellular Band (Part 22H) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	249.43	318.1
190	836.6	249.77	319.5
251	848.8	251.36	318.4

**PCS Band (Part 24E) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	245.80	320.1
661	1880.0	247.61	319.0
810	1909.8	248.96	320.7

**EGPRS (MCS 5):**
**Cellular Band (Part 22H) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	250.56	319.9
190	836.6	251.30	318.2
251	848.8	248.85	313.2

**PCS Band (Part 24E) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	247.26	319.8
661	1880.0	248.33	318.7
810	1909.8	248.29	318.4

**RMC:**
**UMTS-FDD Band V (Part 22H)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.2101	4.884
4175	835.0	4.2038	4.857
4233	846.6	4.2233	4.906

**UMTS-FDD Band II (Part 24E)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.2047	4.860
9400	1880.0	4.2262	4.898
9538	1907.6	4.2150	4.862

**HSDPA:**
**UMTS-FDD Band V (Part 22H)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.2229	4.875
4175	835.0	4.2062	4.843
4233	846.6	4.2170	4.891

**UMTS-FDD Band II (Part 24E)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.2128	4.858
9400	1880.0	4.2225	4.895
9538	1907.6	4.2097	4.877

**HSUPA:**
**UMTS-FDD Band V (Part 22H)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.2097	4.890
4175	835.0	4.2059	4.871
4233	846.6	4.2131	4.900

**UMTS-FDD Band II (Part 24E)**

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.2060	4.871
9400	1880.0	4.2221	4.905
9538	1907.6	4.2085	4.848

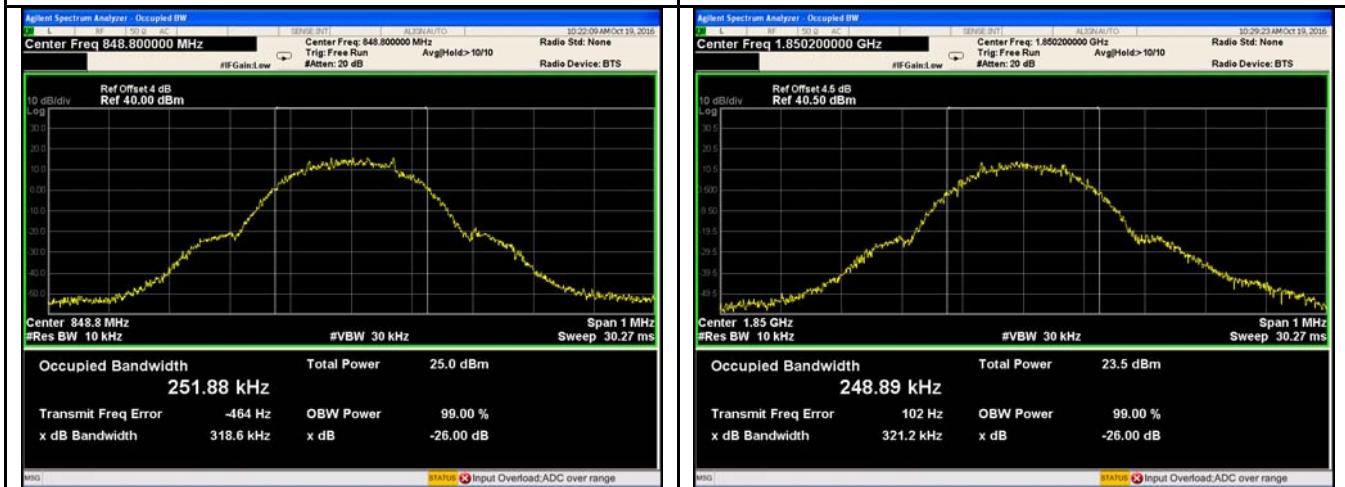
## Test Plots

### GSM Voice:



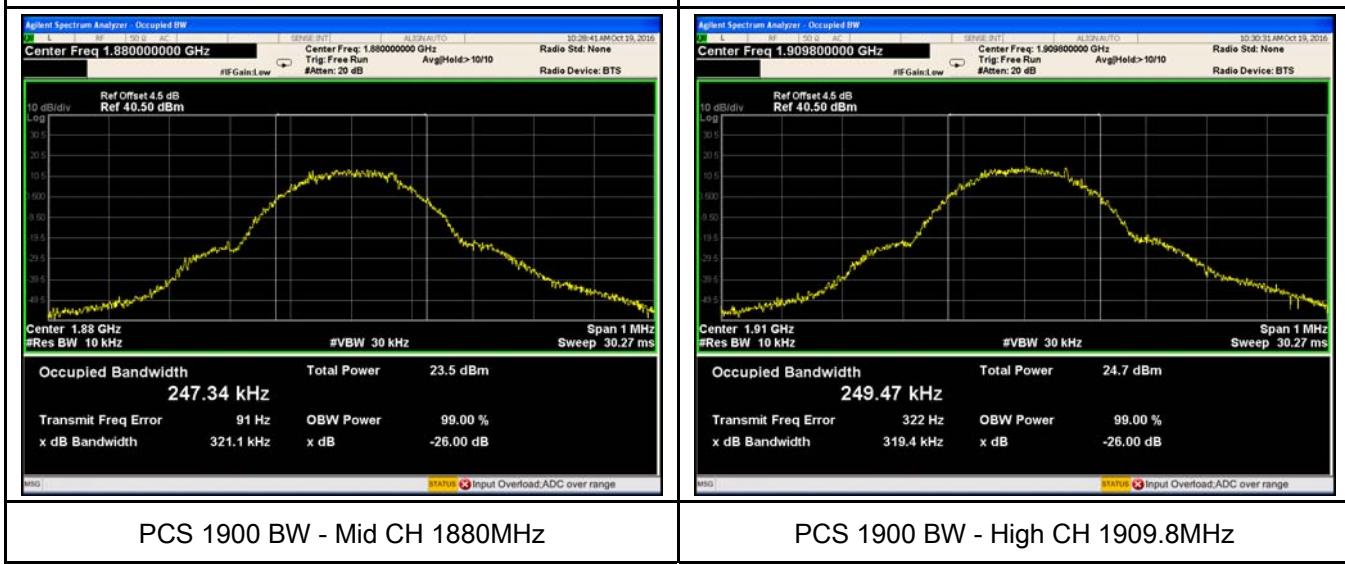
GSM 850 BW - Low CH 824.2MHz

GSM 850 BW - Mid CH 836.6MHz

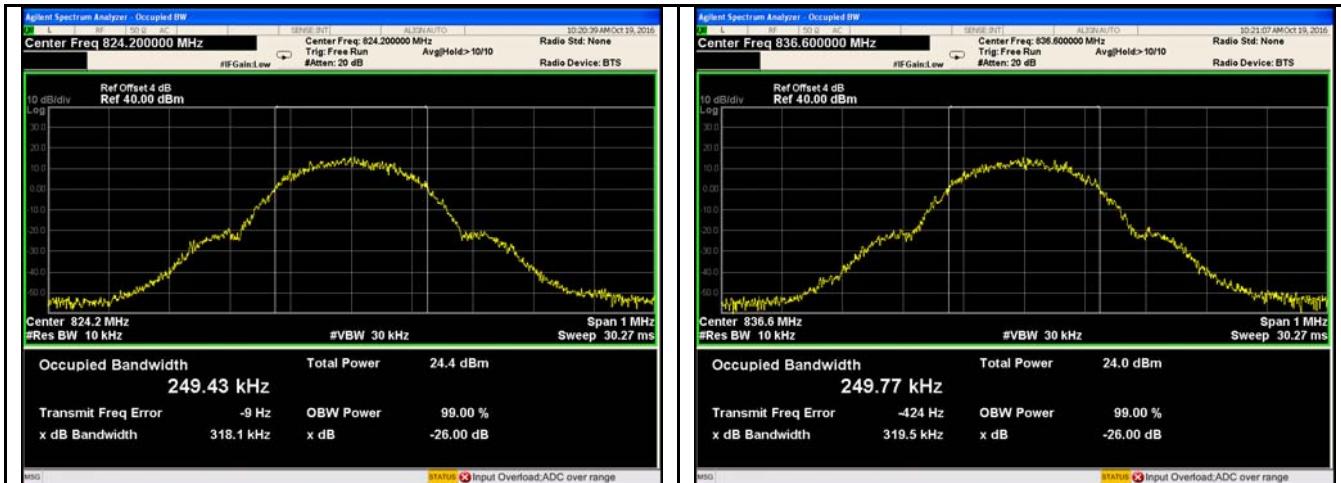


GSM 850 BW - High CH 848.8MHz

PCS 1900 BW - Low CH 1850.2MHz

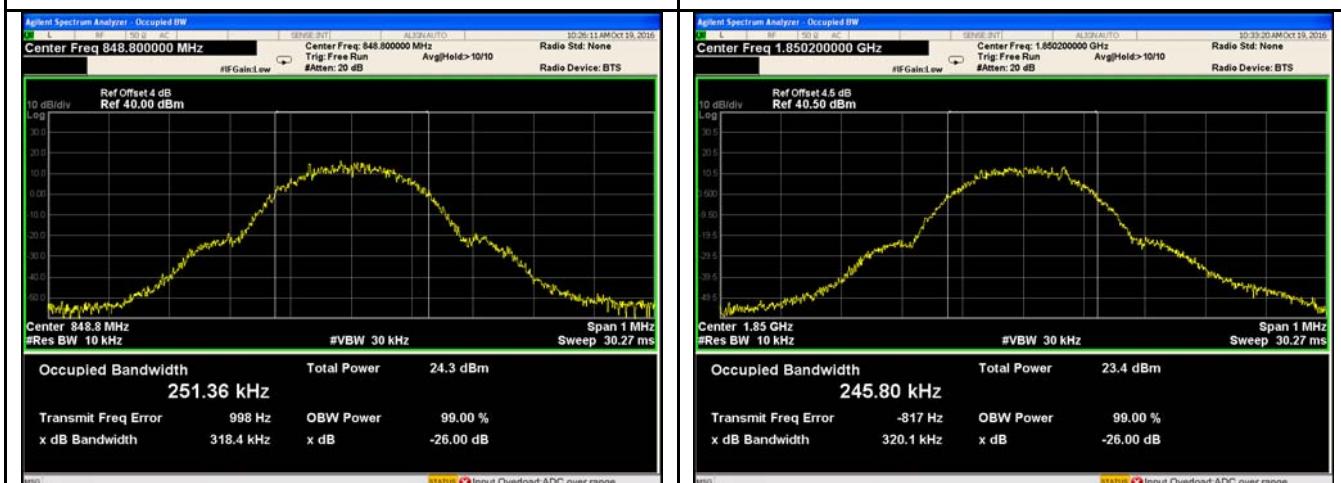


## GPRS:



GSM 850 BW - Low CH 824.2MHz

GSM 850 BW - Mid CH 836.6MHz



GSM 850 BW - High CH 848.8MHz

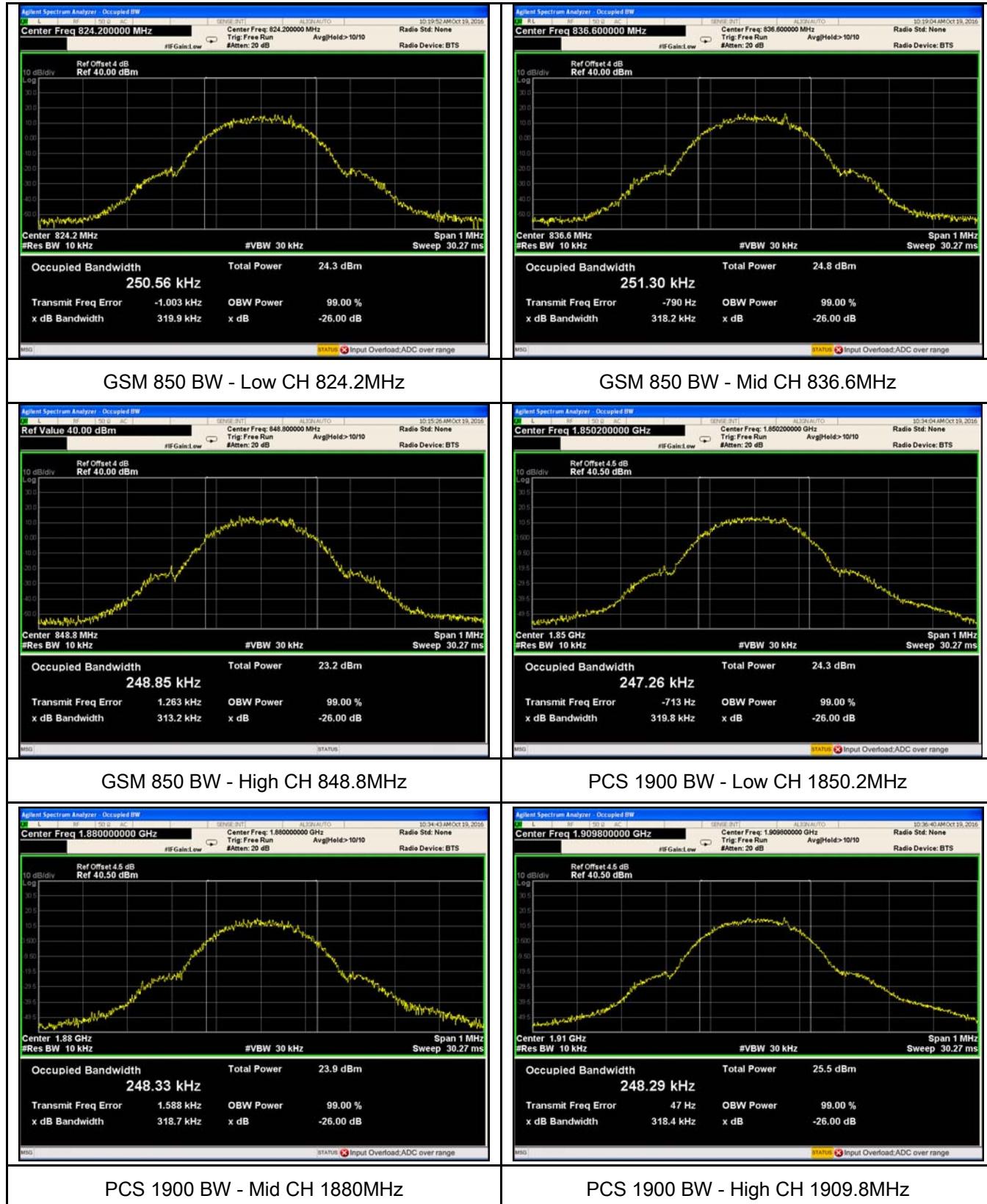
PCS 1900 BW - Low CH 1850.2MHz



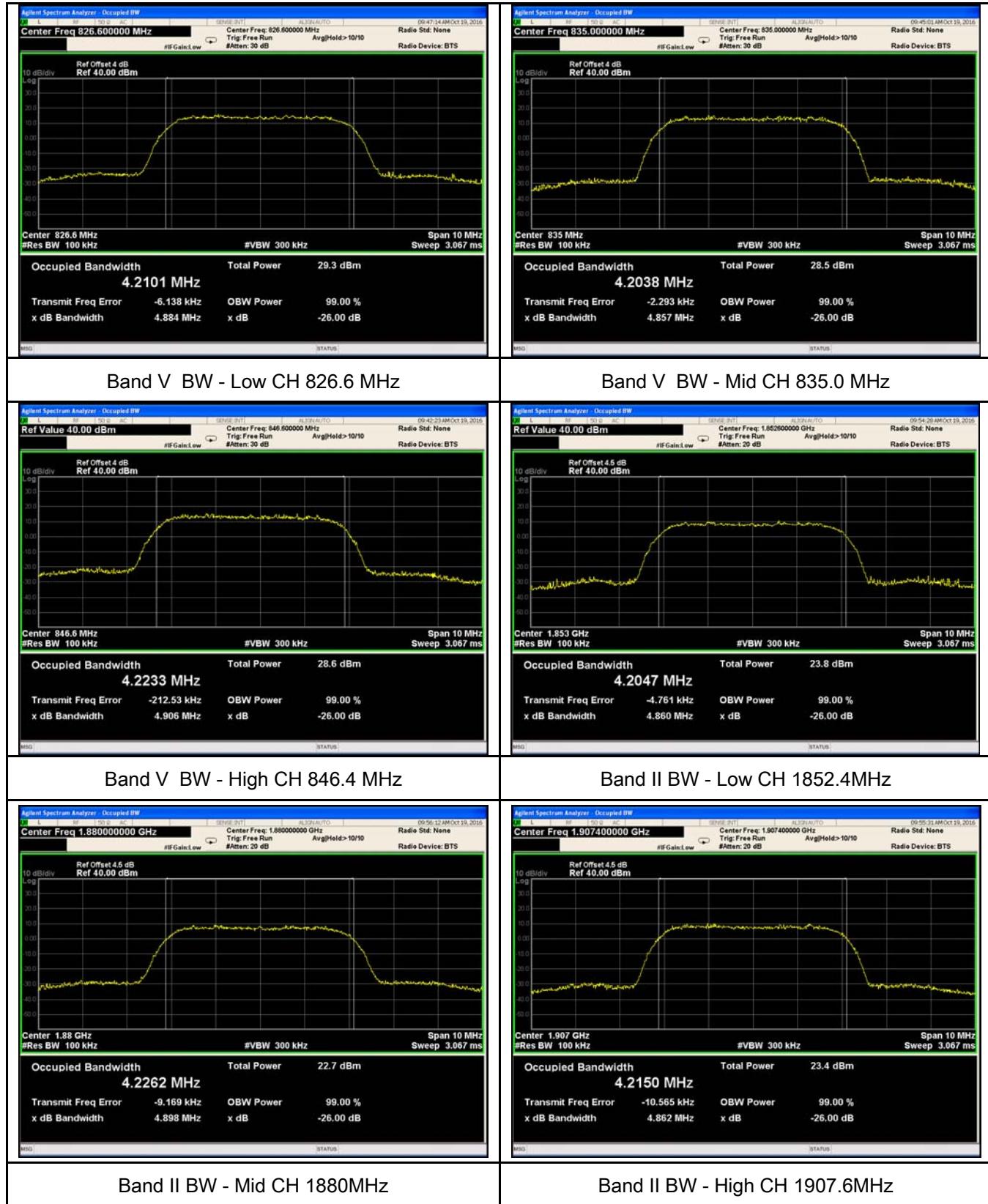
PCS 1900 BW - Mid CH 1880MHz

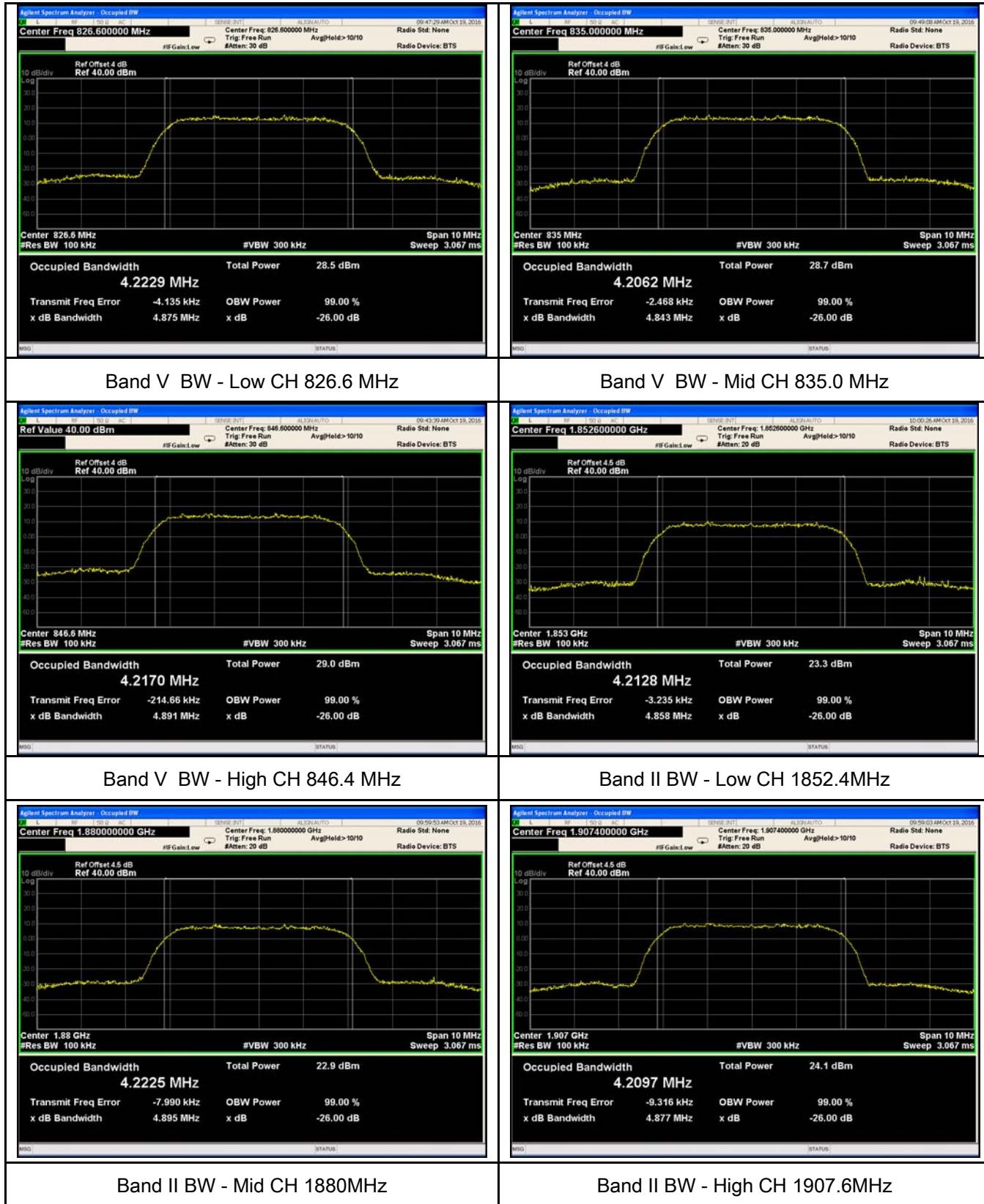
PCS 1900 BW - High CH 1909.8MHz

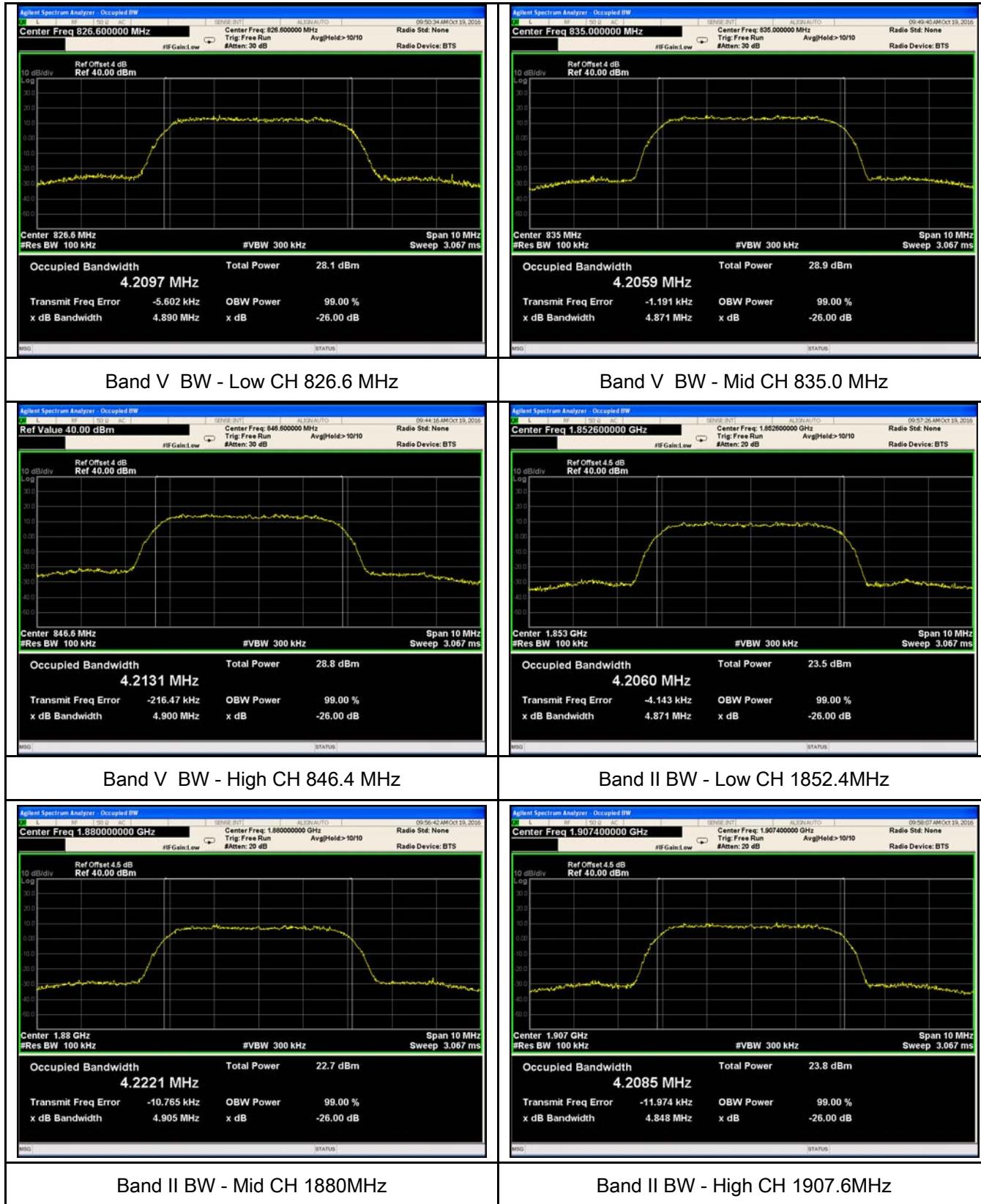
## EGPRS (MCS5):



RMC:



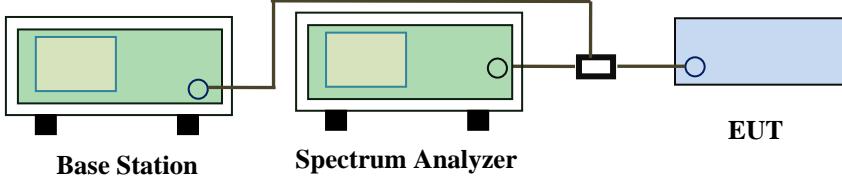
**HSDPA:**


**HSUPA:**


## 6.5 Spurious Emissions at Antenna Terminals

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1051, §22.917(a)& §24.238(a)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB	<input checked="" type="checkbox"/>
Test Setup		 <p style="text-align: center;">Base Station      Spectrum Analyzer      EUT</p>	
Test Procedure		<ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The Band Edges of low and high channels for the highest RF powers were measured.</li> <li>- Setting RBW as roughly BW/100.</li> </ul>	
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

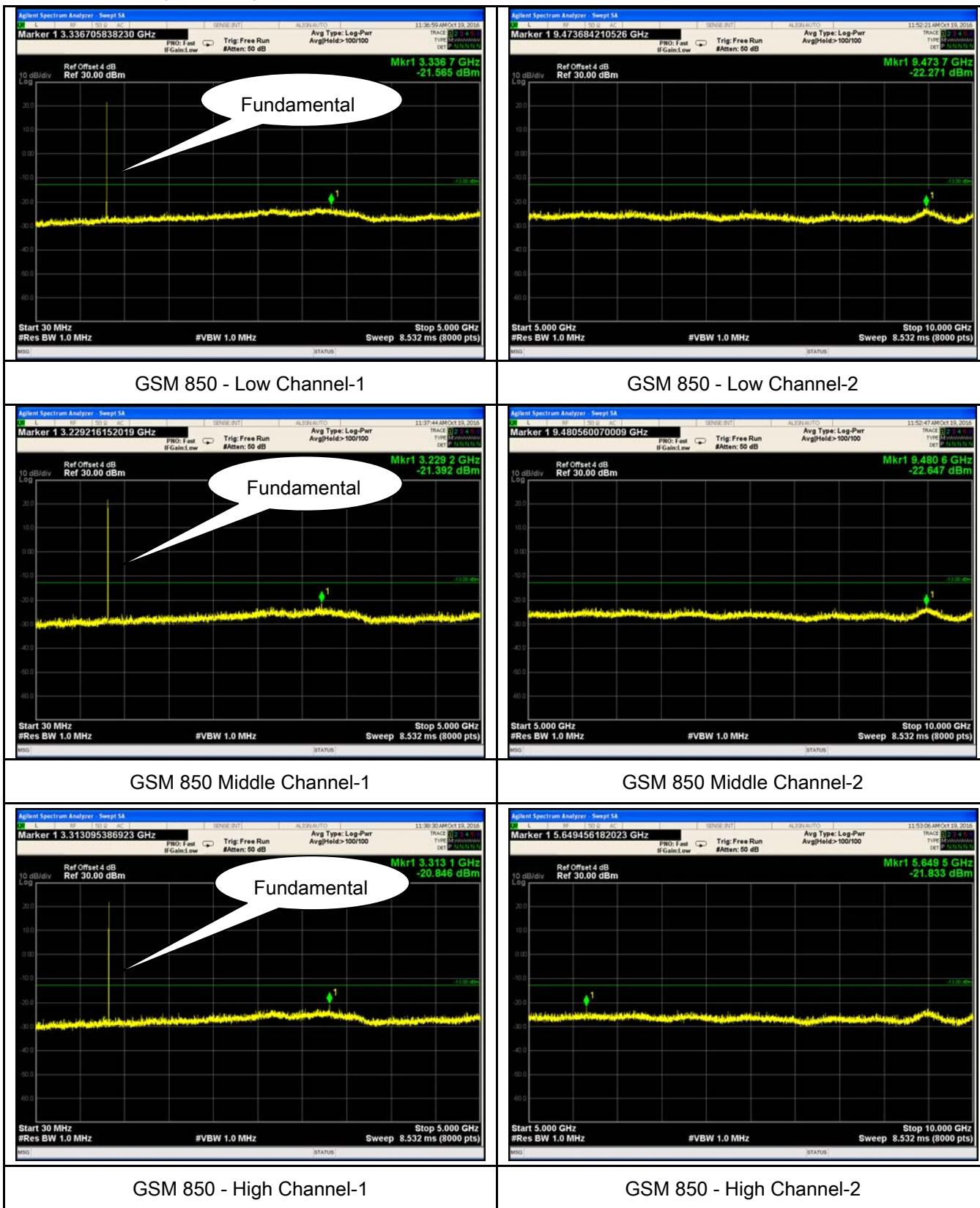
Test Data     Yes       N/A  
 Test Plot     Yes (See below)       N/A

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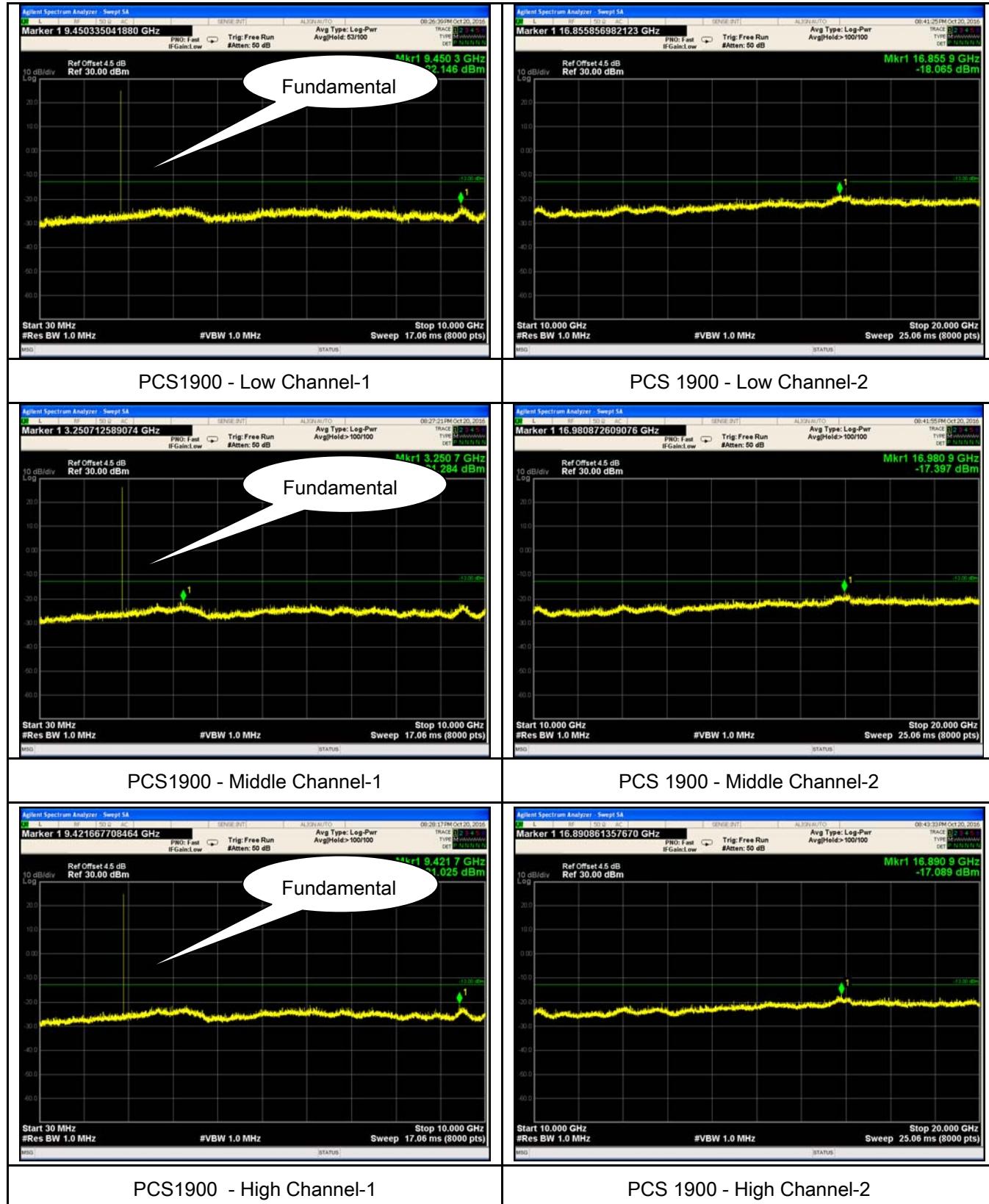
## Test Plots

GSM Voice:

Cellular Band (Part 22H) result



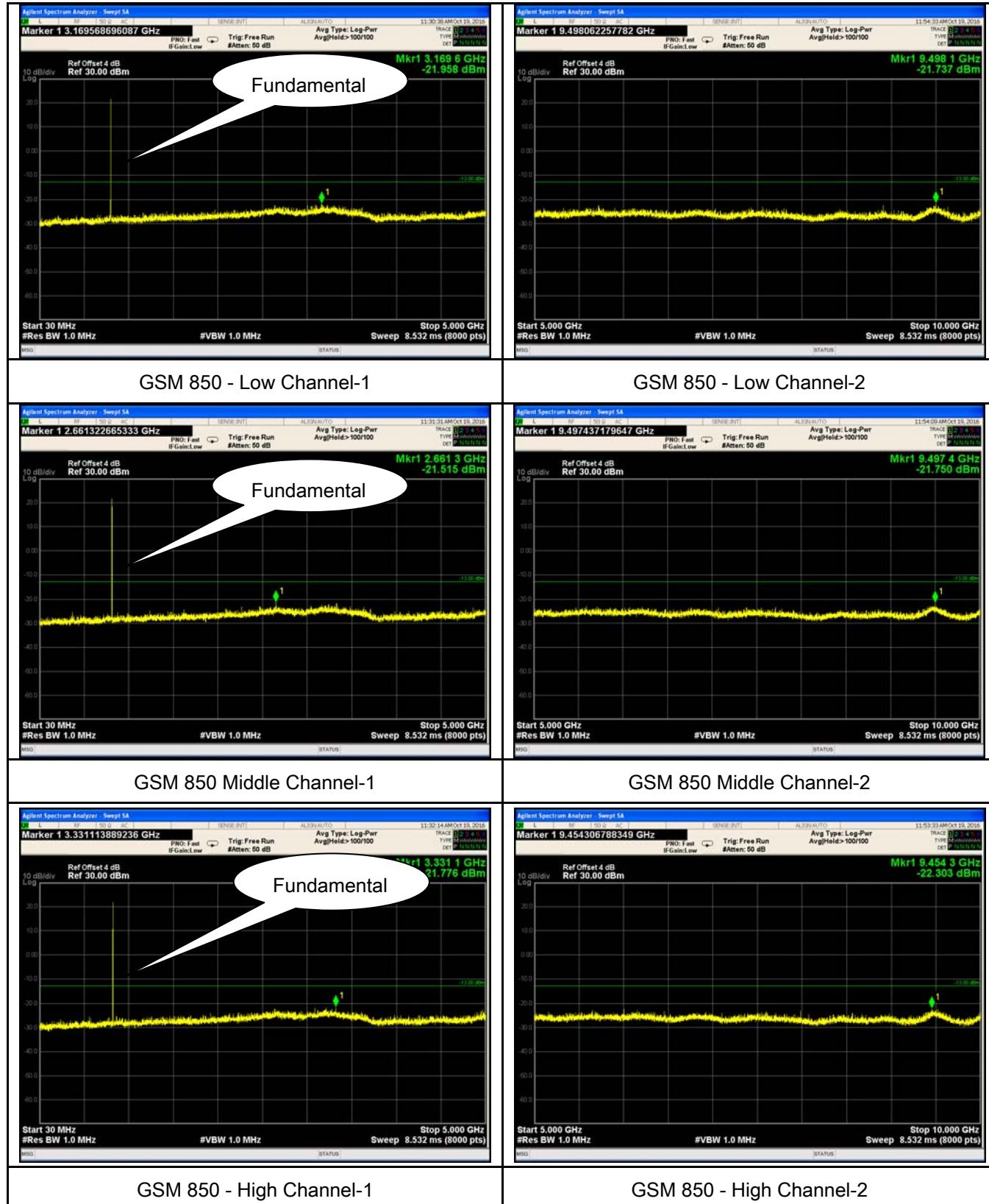
## PCS Band (Part24E) result



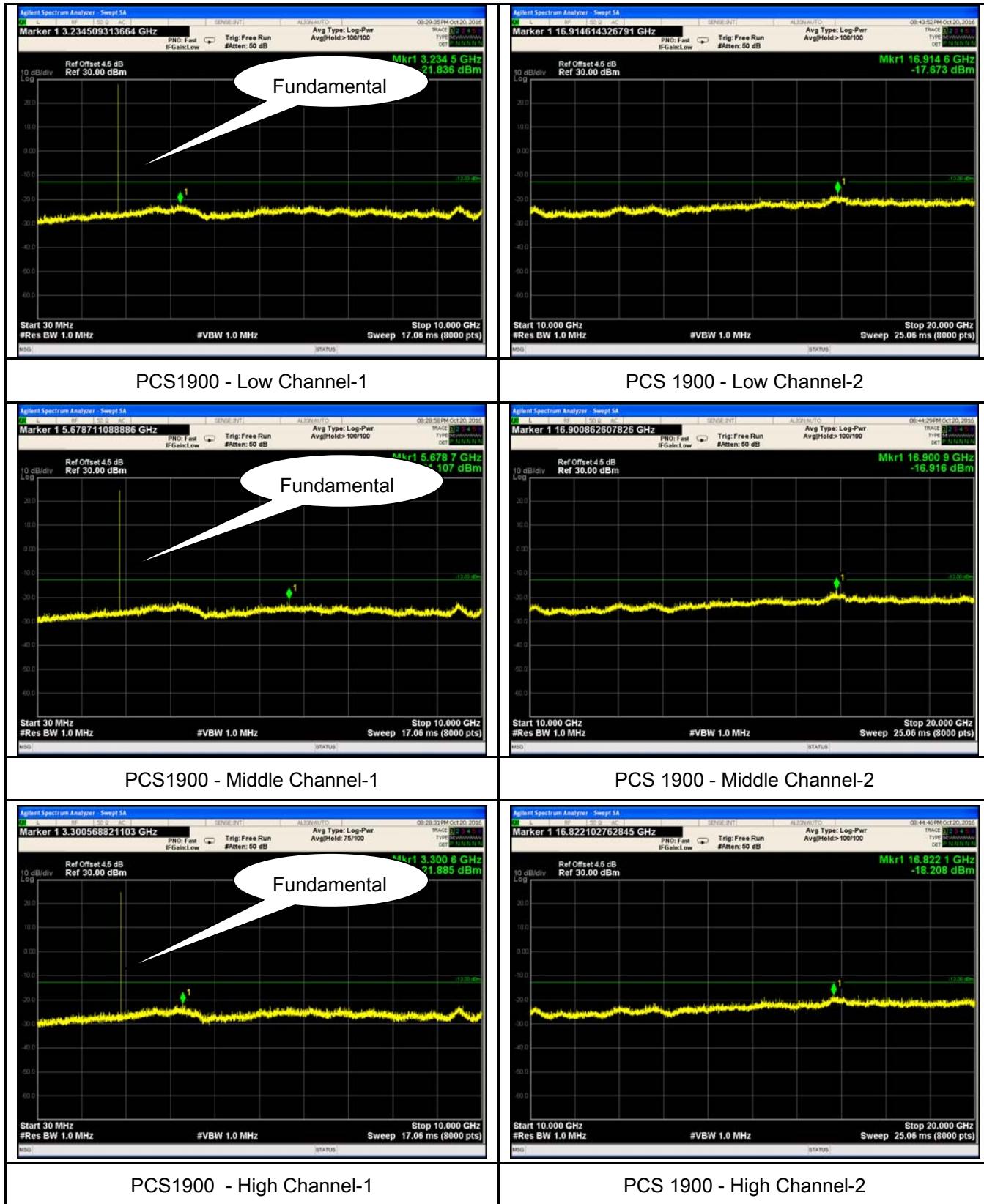
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## GPRS:

### Cellular Band (Part 22H) result

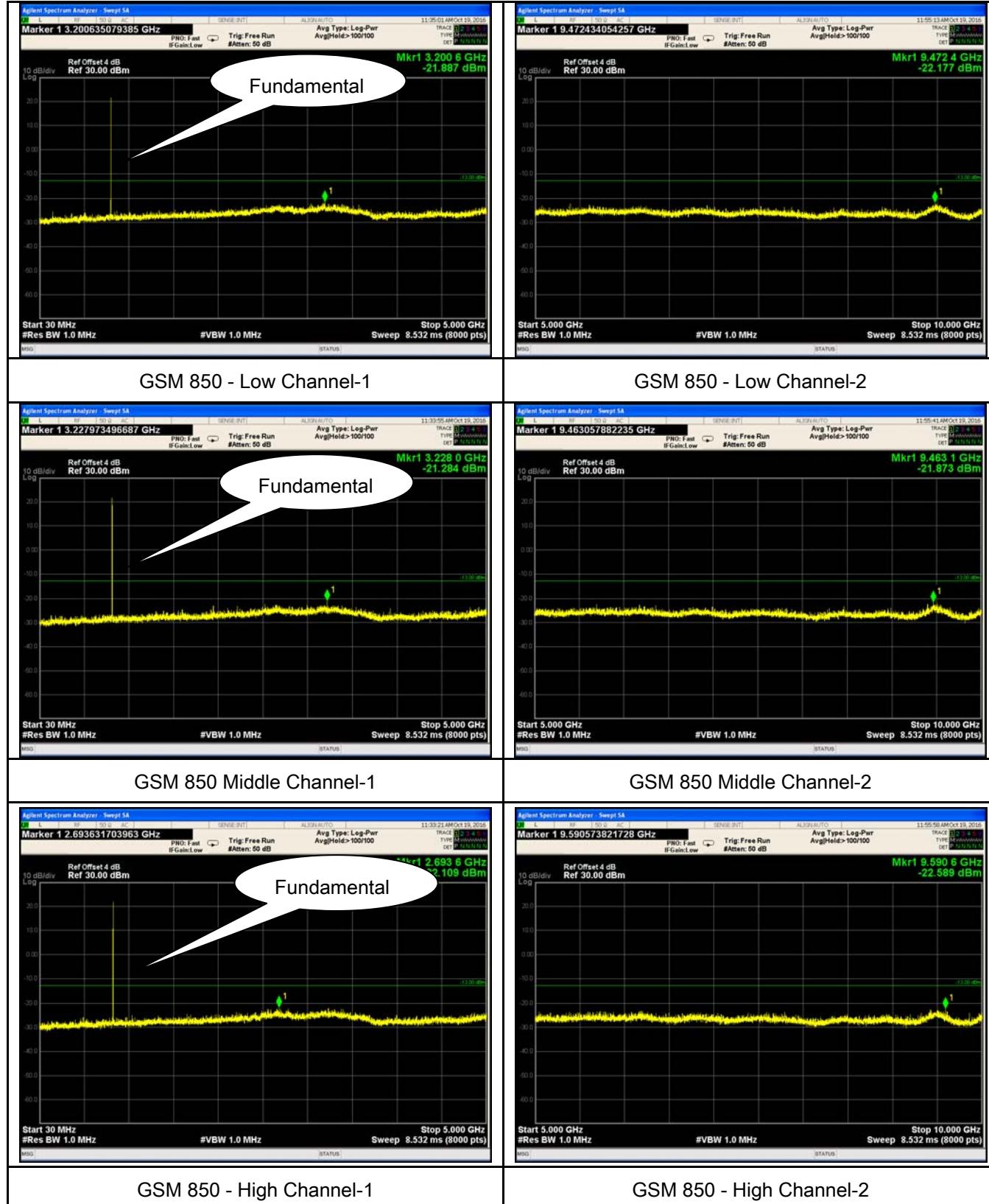


## PCS Band (Part24E) result

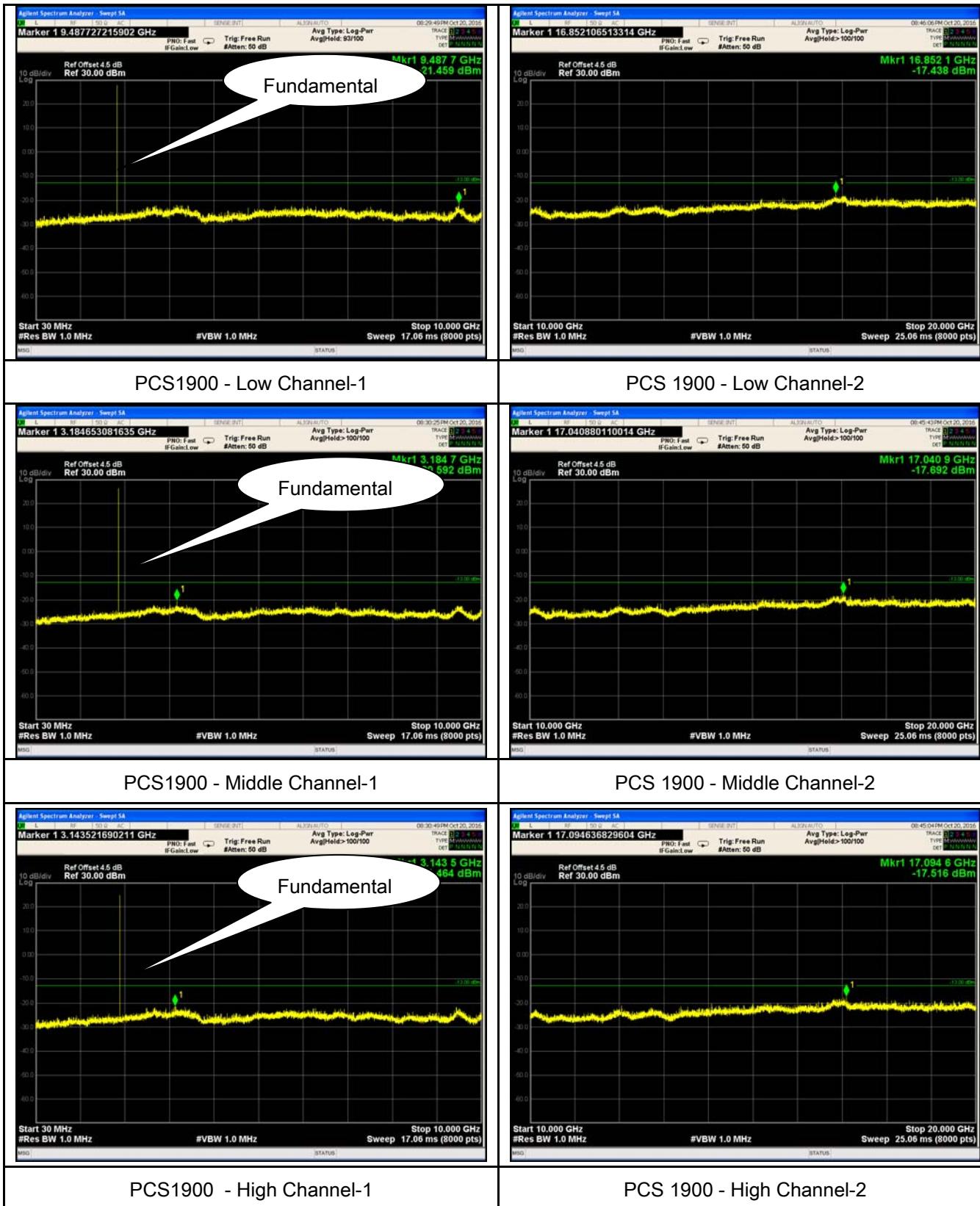


## EGPRS (MCS 5):

### Cellular Band (Part 22H) result

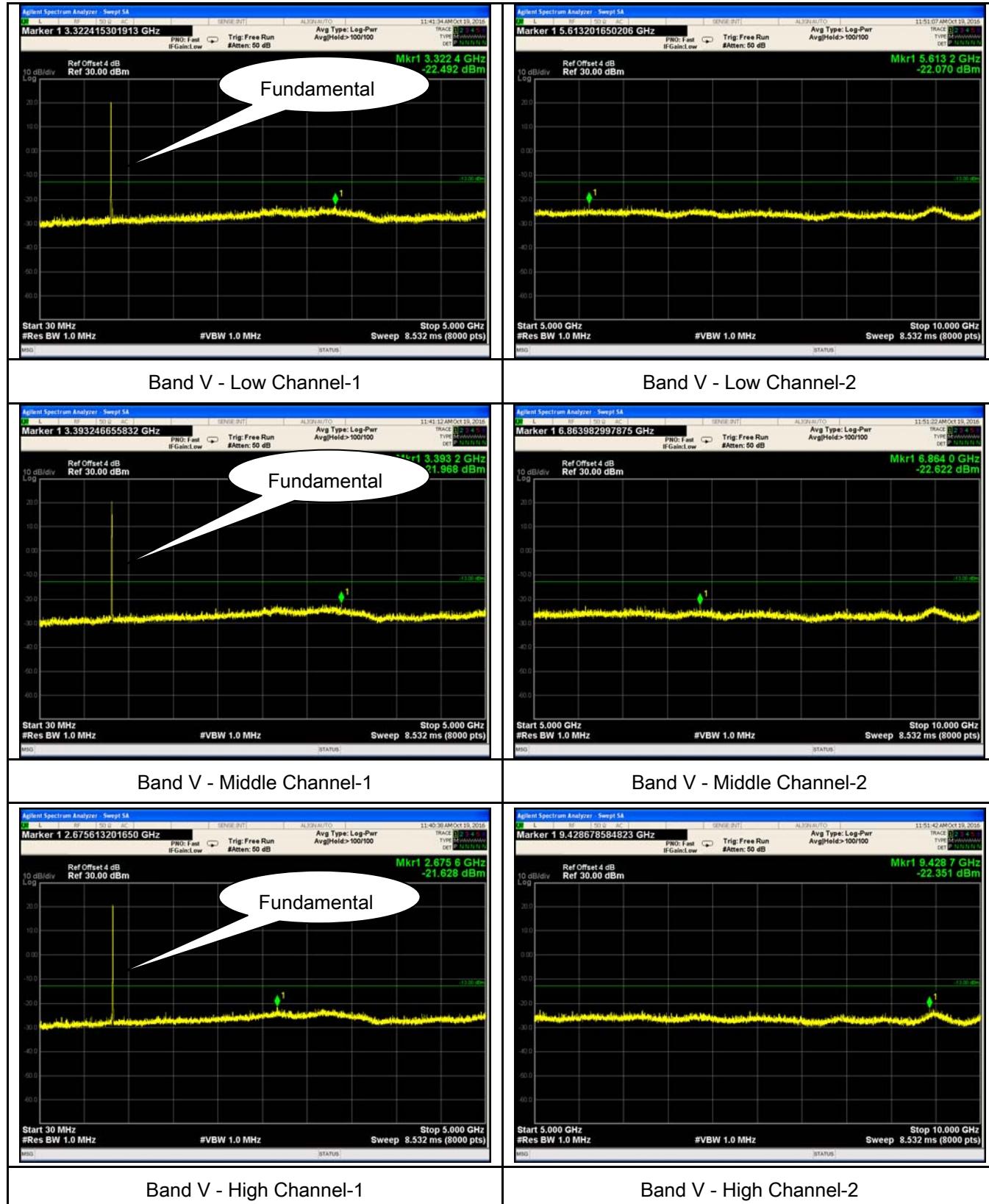


## PCS Band (Part24E) result

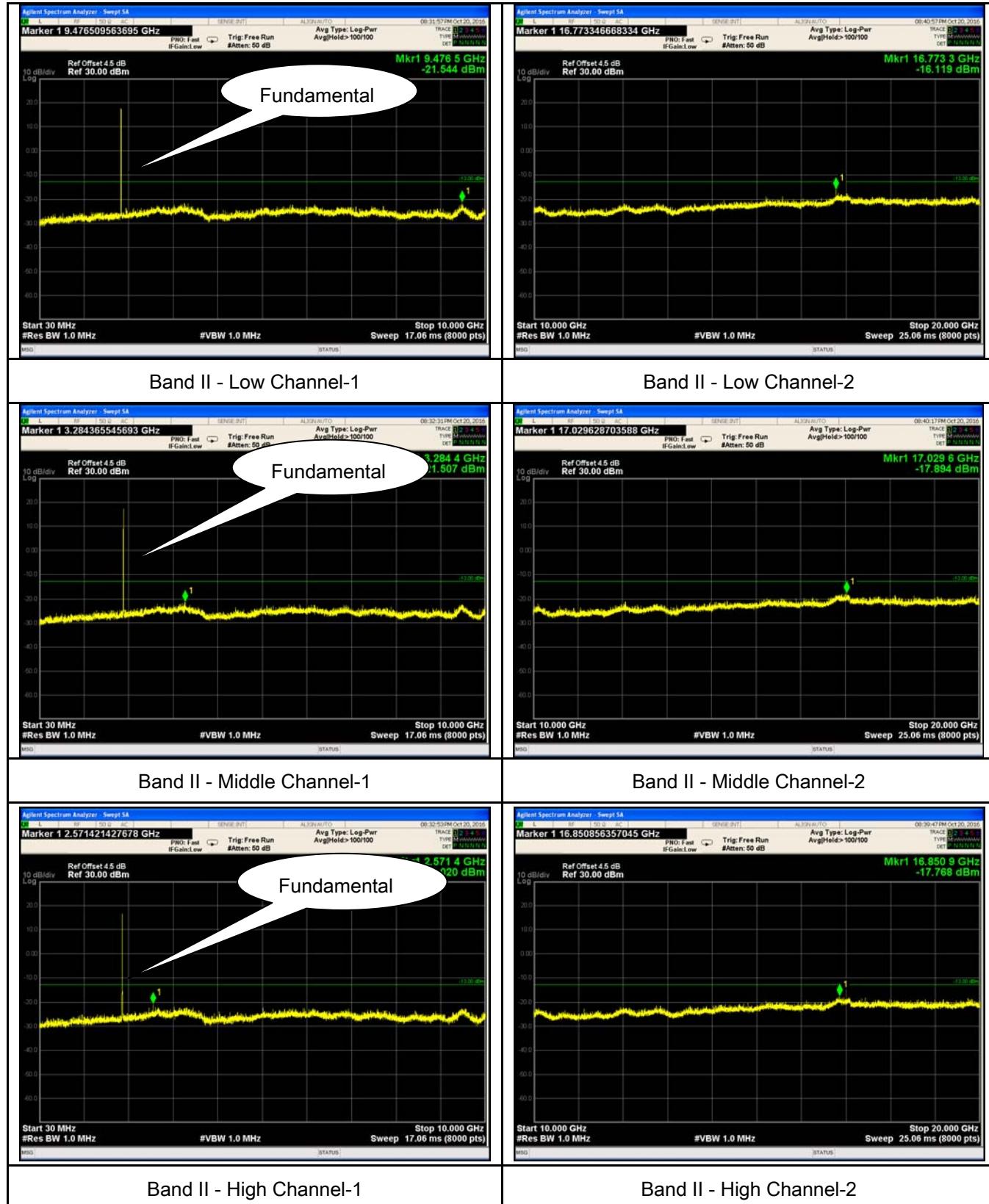


## RMC

### UMTS-FDD Band V (Part 22H)

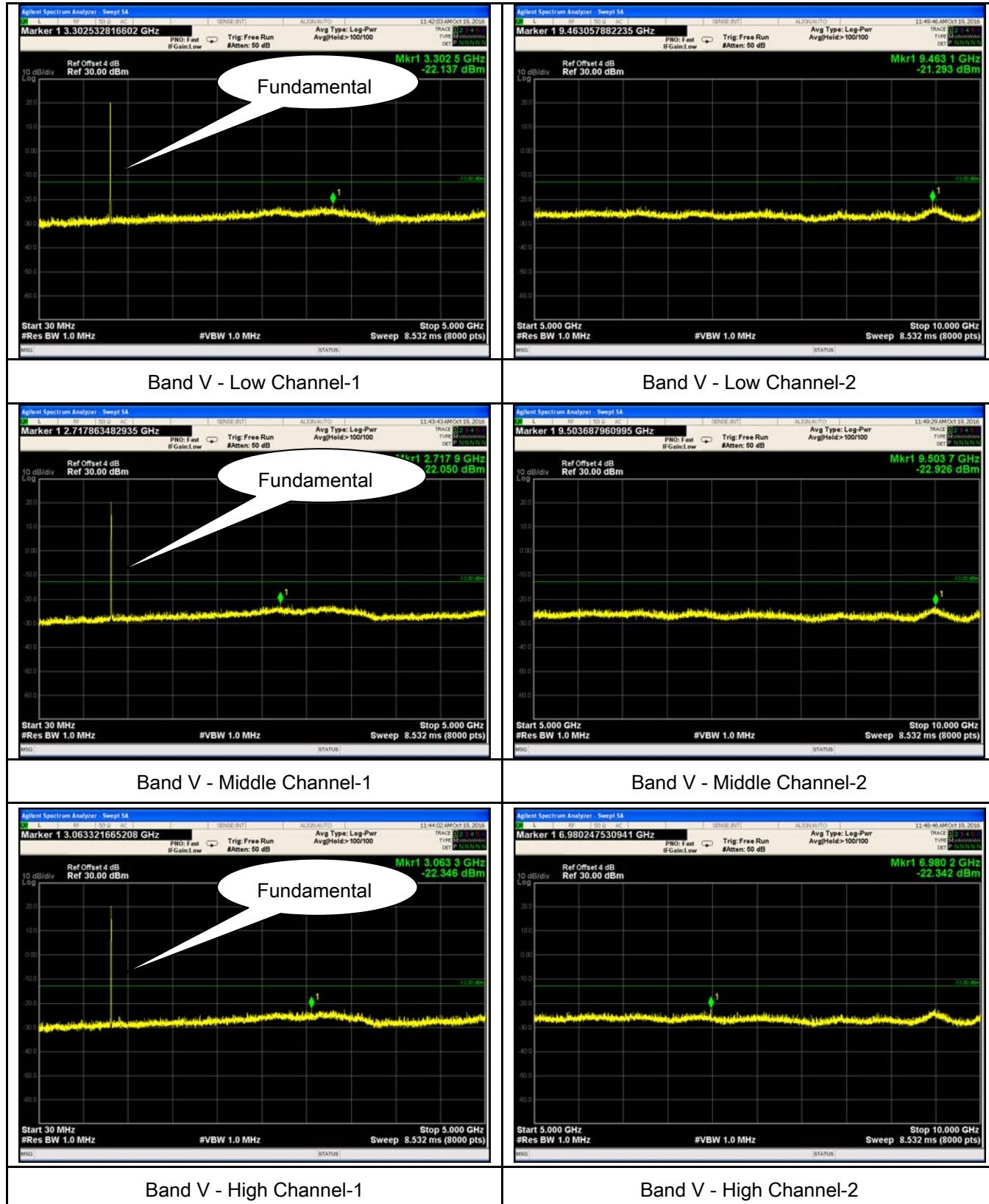


## UMTS-FDD Band II (Part 24E)

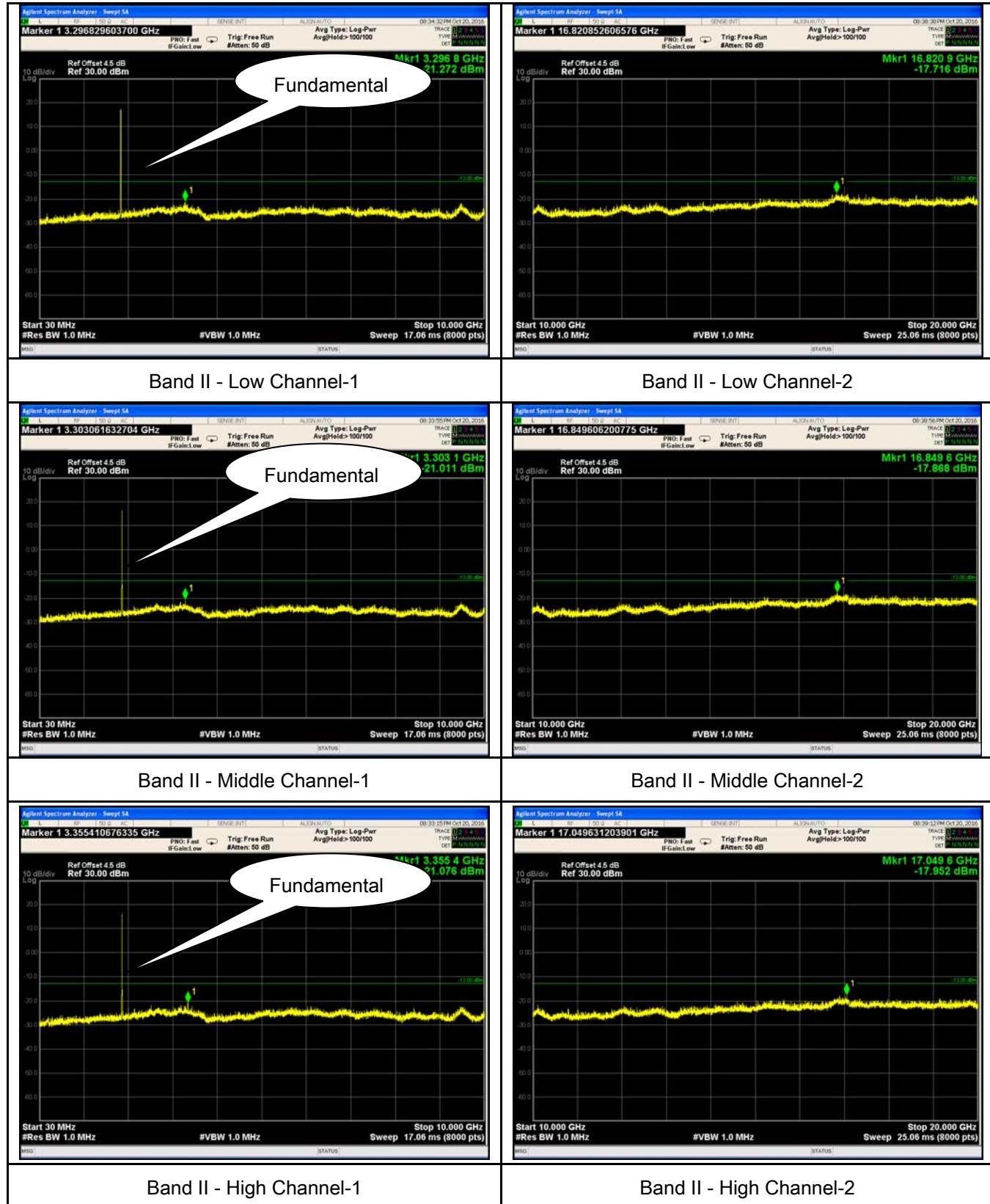


## HSDPA:

### UMTS-FDD Band V (Part 22H)

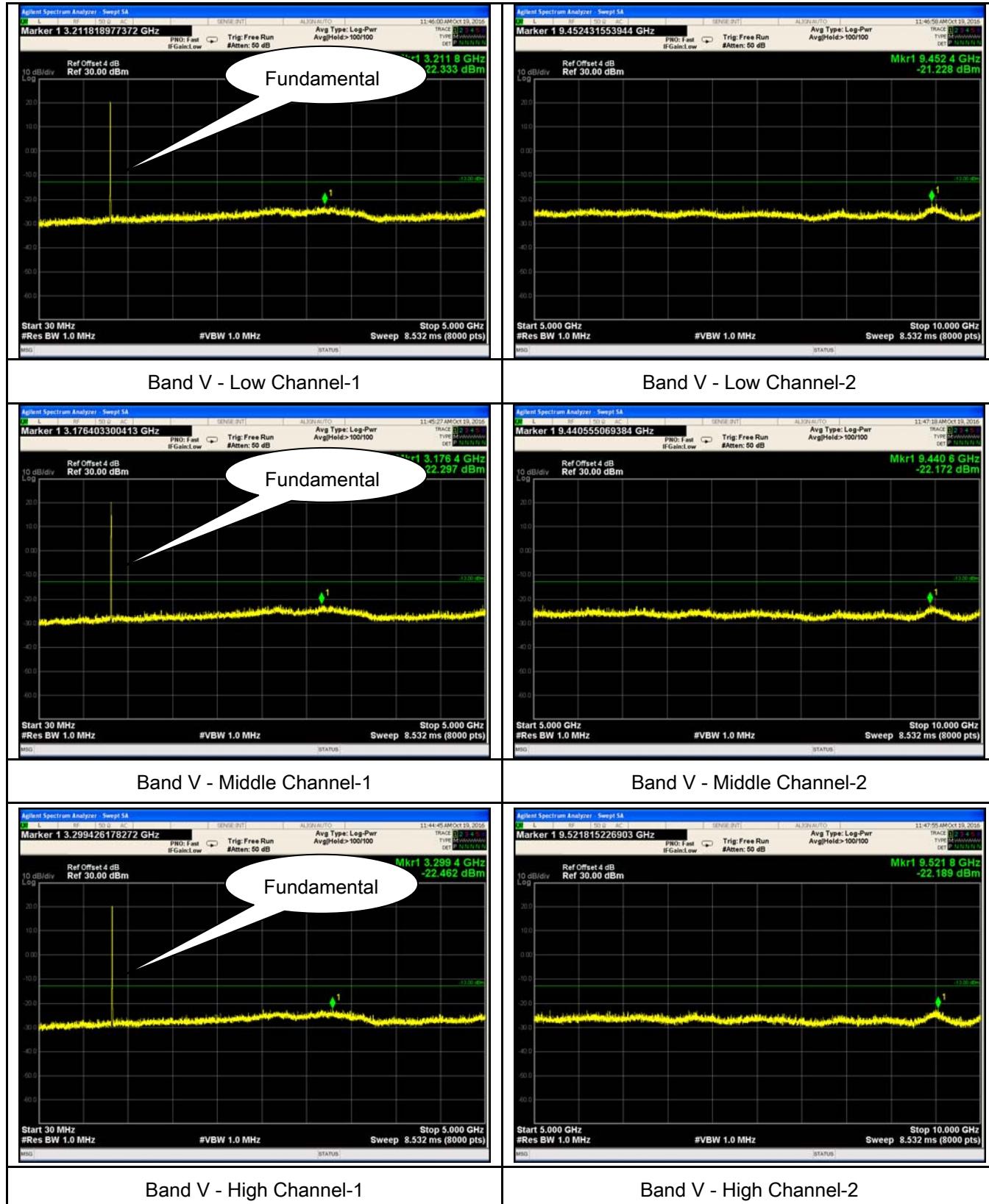


### UMTS-FDD Band II (Part 24E)

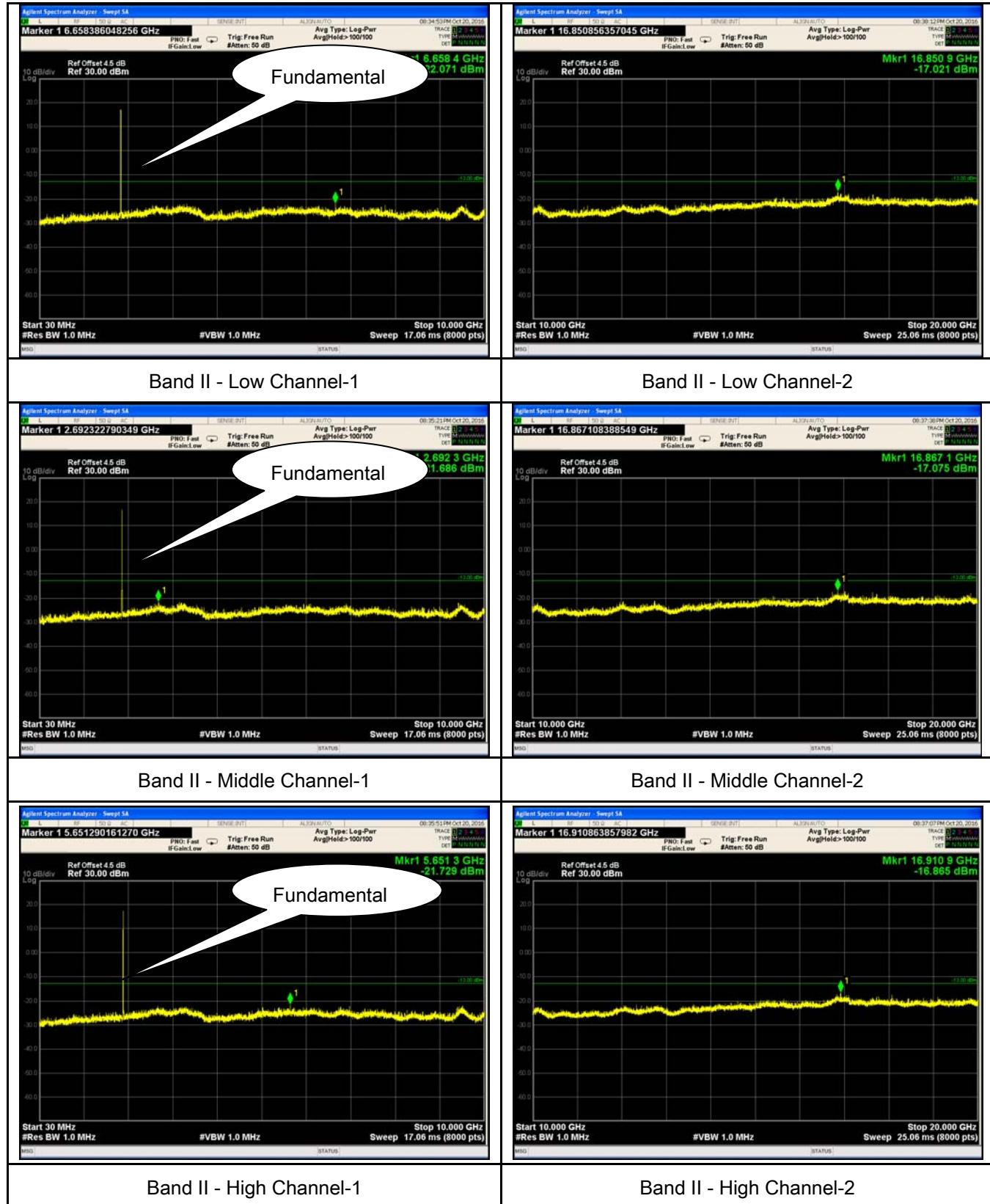


## HSUPA:

### UMTS-FDD Band V (Part 22H)



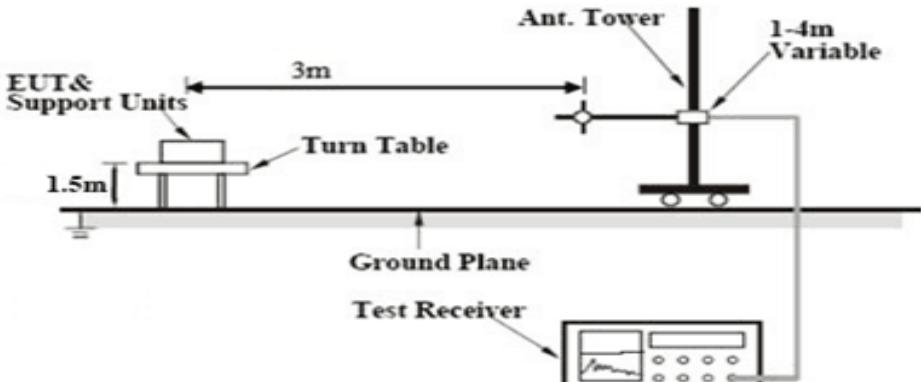
## UMTS-FDD Band II (Part 24E)



## 6.6 Spurious Radiated Emissions

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §24.238	a)	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.	<input checked="" type="checkbox"/>
Test setup			
Test Procedure	<ol style="list-style-type: none"> <li>1. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>3. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</li> </ol> <p>Sample Calculation:</p> <p>EUT Field Strength = Raw Amplitude (dB<math>\mu</math>V/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)</p>		

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Remark		
Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

### Cellular Band (Part 22H) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1648.4	-43.49	V	7.95	0.78	-36.32	-13	-23.32
1648.4	-44.02	H	7.95	0.78	-36.85	-13	-23.85
326.8	-52.54	V	6.4	0.26	-46.4	-13	-33.4
604.2	-52.71	H	6.8	0.37	-46.28	-13	-33.28

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1673.2	-43.53	V	7.95	0.78	-36.36	-13	-23.36
1673.2	-44.03	H	7.95	0.78	-36.86	-13	-23.86
329.5	-52.64	V	6.4	0.26	-46.5	-13	-33.5
603.4	-52.73	H	6.8	0.37	-46.3	-13	-33.3

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1697.6	-43.28	V	7.95	0.78	-36.11	-13	-23.11
1697.6	-43.76	H	7.95	0.78	-36.59	-13	-23.59
327.4	-52.44	V	6.4	0.26	-46.3	-13	-33.3
602.8	-52.57	H	6.8	0.37	-46.14	-13	-33.14

#### Note:

- 1, The testing has been conformed to  $10 * 848.8 \text{ MHz} = 8,488 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, GSM voice , GPRS and EGPRS mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

### PCS Band (Part24E) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3700.4	-48.57	V	10.25	2.73	-41.05	-13	-28.05
3700.4	-49.11	H	10.25	2.73	-41.59	-13	-28.59
326.9	-53.32	V	6.4	0.26	-47.18	-13	-34.18
605.1	-53.83	H	6.8	0.37	-47.4	-13	-34.40

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-48.62	V	10.25	2.73	-41.1	-13	-28.10
3760	-49.25	H	10.25	2.73	-41.73	-13	-28.73
327.3	-53.09	V	6.4	0.26	-46.95	-13	-33.95
603.8	-53.47	H	6.8	0.37	-47.04	-13	-34.04

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3819.6	-48.67	V	10.36	2.73	-41.04	-13	-28.04
3819.6	-49.16	H	10.36	2.73	-41.53	-13	-28.53
327.6	-53.12	V	6.4	0.26	-46.98	-13	-33.98
602.9	-52.06	H	6.8	0.37	-45.63	-13	-32.63

#### Note:

- 1, The testing has been conformed to  $10 * 1909.8 \text{ MHz} = 19,098 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, GSM voice , GPRS and EGPRS mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

### UMTS-FDD Band V (Part 22H)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1652.8	-46.24	V	7.95	0.78	-39.07	-13	-26.07
1652.8	-45.83	H	7.95	0.78	-38.66	-13	-25.66
326.4	-52.71	V	6.4	0.26	-46.57	-13	-33.57
603.3	-53.06	H	6.8	0.37	-46.63	-13	-33.63

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1670	-46.13	V	7.95	0.78	-38.96	-13	-25.96
1670	-45.79	H	7.95	0.78	-38.62	-13	-25.62
328.9	-52.39	V	6.4	0.26	-46.25	-13	-33.25
604.7	-52.75	H	6.8	0.37	-46.32	-13	-33.32

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1693.2	-46.31	V	7.95	0.78	-39.14	-13	-26.14
1693.2	-45.78	H	7.95	0.78	-38.61	-13	-25.61
327.1	-52.64	V	6.4	0.26	-46.5	-13	-33.50
602.4	-52.98	H	6.8	0.37	-46.55	-13	-33.55

**Note:**

- 1, The testing has been conformed to  $10 * 846.6 \text{ MHz} = 8,466 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

### UMTS-FDD Band II (Part 24E)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3704.8	-49.27	V	10.25	2.73	-41.75	-13	-28.75
3704.8	-49.76	H	10.25	2.73	-42.24	-13	-29.24
328.5	-53.36	V	6.4	0.26	-47.22	-13	-34.22
603.6	-53.15	H	6.8	0.37	-46.72	-13	-33.72

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-49.05	V	10.25	2.73	-41.53	-13	-28.53
3760	-49.51	H	10.25	2.73	-41.99	-13	-28.99
330.1	-53.57	V	6.4	0.26	-47.43	-13	-34.43
601.2	-53.21	H	6.8	0.37	-46.78	-13	-33.78

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3815.2	-49.17	V	10.36	2.73	-41.54	-13	-28.54
3815.2	-49.62	H	10.36	2.73	-41.99	-13	-28.99
328.1	-53.28	V	6.4	0.26	-47.14	-13	-34.14
604.8	-53.71	H	6.8	0.37	-47.28	-13	-34.28

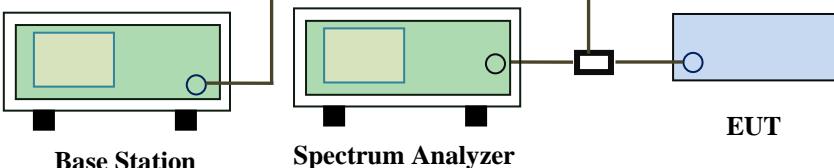
**Note:**

- 1, The testing has been conformed to  $10 * 1907.6 \text{ MHz} = 19,076 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case

## 6.7 Band Edge

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §24.238(a)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.	<input checked="" type="checkbox"/>
Test setup		 <p style="text-align: center;"> <b>Base Station</b>      <b>Spectrum Analyzer</b>      <b>EUT</b> </p>	
Procedure		<ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.</li> </ul>	
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data  Yes  N/A  
 Test Plot  Yes (See below)  N/A

**GSM Voice:**
**Cellular Band (Part 22H) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9950	-20.712	-13
849.0193	-22.523	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9967	-19.691	-13
1910.0083	-19.448	-13

**GPRS:**
**Cellular Band (Part 22H) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9983	-18.929	-13
849.0210	-21.878	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9967	-19.928	-13
1910.0167	-20.193	-13

**EGPRS (MCS5):**
**Cellular Band (Part 22H) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9933	-22.422	-13
849.0193	-18.374	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9817	-20.774	-13
1910.0083	-20.143	-13

**RMC:**
**UMTS-FDD Band V (Part 22H)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.998	-24.566	-13
849.001	-24.464	-13

**UMTS-FDD Band II (Part 24E)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1848.883	-26.812	-13
1910.250	-30.450	-13

**HSDPA:**
**UMTS-FDD Band V (Part 22H)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.999	-24.786	-13
849.151	-25.630	-13

**UMTS-FDD Band II (Part 24E)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.983	-29.384	-13
1910.317	-29.878	-13

**HSUPA:**
**UMTS-FDD Band V (Part 22H)**

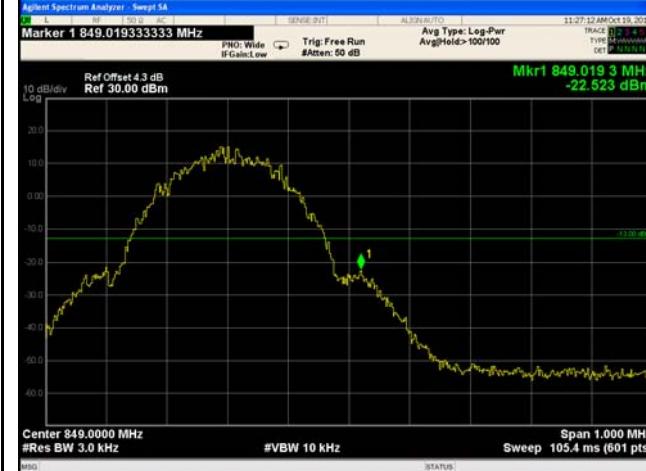
Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.998	-24.068	-13
849.001	-24.689	-13

**UMTS-FDD Band II (Part 24E)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.967	-27.230	-13
1910.533	-30.966	-13

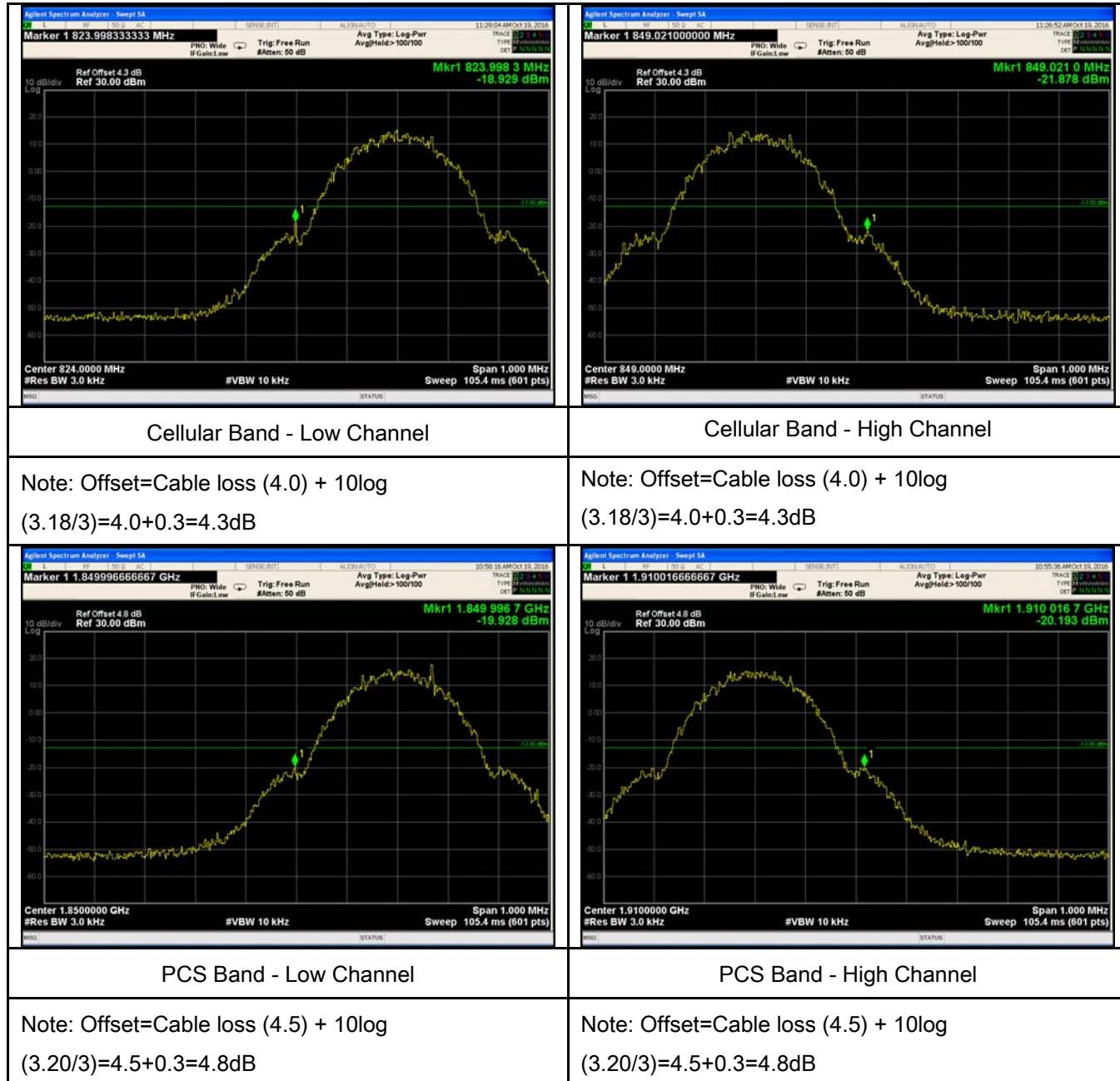
## GSM Voice:

### Test Plots

 <p>Marker 1 823.995000000 MHz</p> <p>Mkr1 823.995 0 MHz -20.712 dBm</p> <p>Center 824.00000 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>	 <p>Marker 1 849.019333333 MHz</p> <p>Mkr1 849.019 3 MHz -22.523 dBm</p> <p>Center 849.00000 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>
Cellular Band - Low Channel	Cellular Band - High Channel
Note: Offset=Cable loss (4.0) + 10log $(3.19/3)=4.0+0.3=4.3\text{dB}$	Note: Offset=Cable loss (4.0) + 10log $(3.18/3)=4.0+0.3=4.3\text{dB}$
 <p>Marker 1 1.8499966666667 GHz</p> <p>Mkr1 1.849 996 7 GHz -19.691 dBm</p> <p>Center 1.8500000 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>	 <p>Marker 1 1.910008333333 GHz</p> <p>Mkr1 1.910 008 3 GHz -19.448 dBm</p> <p>Center 1.9100000 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>
PCS Band - Low Channel	PCS Band - High Channel
Note: Offset=Cable loss (4.0) + 10log $(3.21/3)=4.5+0.3=4.8\text{dB}$	Note: Offset=Cable loss (4.0) + 10log $(3.19/3)=4.5+0.3=4.8\text{dB}$

## GPRS:

### Test Plots



## EGPRS (MCS5):

### Test Plots

 <p>Marker 1 823.99333333 MHz</p> <p>Ref Offset 4.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 824.0000 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>	 <p>Marker 1 849.019333333 MHz</p> <p>Ref Offset 4.2 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 849.0000 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>
Cellular Band - Low Channel	Cellular Band - High Channel
Note: Offset=Cable loss (4.0) + 10log $(3.19/3)=4.0+0.3=4.3\text{dB}$	Note: Offset=Cable loss (4.0) + 10log $(3.13/3)=4.0+0.2=4.2\text{dB}$
 <p>Marker 1 1.849981666667 GHz</p> <p>Ref Offset 4.8 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 1.8500000 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>	 <p>Marker 1 1.910008333333 GHz</p> <p>Ref Offset 4.8 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 1.9100000 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 1.000 MHz Span 105.4 ms (601 pts)</p>
PCS Band - Low Channel	PCS Band - High Channel
Note: Offset=Cable loss (4.5) + 10log $(3.19/3)=4.5+0.3=4.8\text{dB}$	Note: Offset=Cable loss (4.5) + 10log $(3.18/3)=4.5+0.3=4.8\text{dB}$

**RMC:**


UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
 $(48.84/30)=4.0+2.1=6.1$  dB

UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
 $(49.06/30)=4.0+2.1=6.1$  dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
 $(48.60/30)=4.5+2.1=6.6$  dB

UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log  
 $(48.62/30)=4.5+2.1=6.6$  dB

**HSDPA:**

**UMTS-FDD Band V - Low Channel**

Note: Offset=Cable loss (4.0) + 10log  
 $(48.75/30)=4.0+2.1=6.1$  dB


**UMTS-FDD Band V - High Channel**

Note: Offset=Cable loss (4.0) + 10log  
 $(48.91/30)=4.0+2.1=6.1$  dB

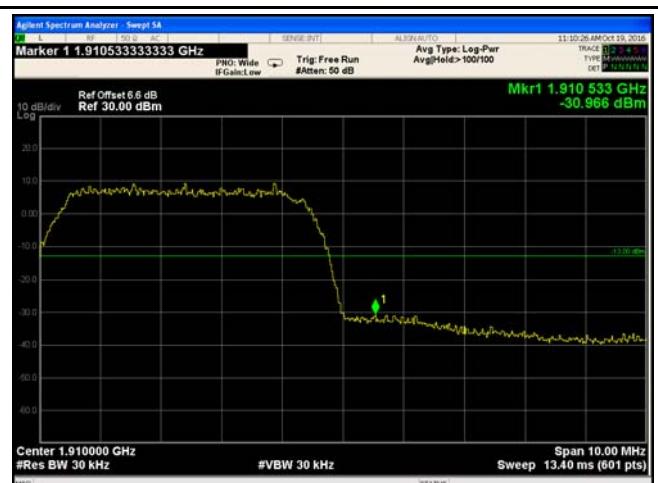

**UMTS-FDD Band II - Low Channel**

Note: Offset=Cable loss (4.5) + 10log  
 $(48.58/30)=4.0+2.1=6.6$  dB

**UMTS-FDD Band II - High Channel**

Note: Offset=Cable loss (4.5) + 10log  
 $(48.77/30)=4.0+2.1=6.6$  dB

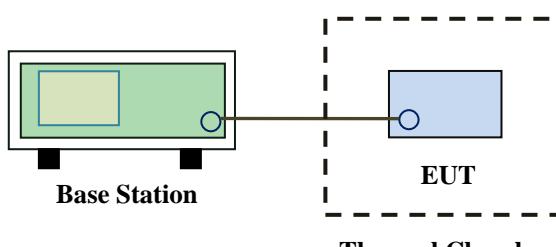
**HSUPA:**

 <p>Marker 1 823.998000000 MHz</p> <p>Mkr1 823.998 MHz -24.068 dBm</p> <p>Ref Offset 6.1 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 824.000 MHz #Res BW 30 kHz #VBW 30 kHz Sweep 13.40 ms (601 pts)</p>	 <p>Marker 1 Δ 849.001000000 MHz</p> <p>Mkr1 849.001 MHz -24.689 dBm</p> <p>Ref Offset 6.1 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 849.000 MHz #Res BW 30 kHz #VBW 30 kHz Sweep 13.40 ms (601 pts)</p>
UMTS-FDD Band V - Low Channel	UMTS-FDD Band V - High Channel
<p>Note: Offset=Cable loss (4.0) + 10log</p> $(48.90/30)=4.0+2.1=6.1 \text{ dB}$	<p>Note: Offset=Cable loss (4.0) + 10log</p> $(49.00/30)=4.0+2.1=6.1 \text{ dB}$
 <p>Marker 1 1.849666666667 GHz</p> <p>Mkr1 1.849.967 GHz -27.230 dBm</p> <p>Ref Offset 6.6 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 1.850000 GHz #Res BW 30 kHz #VBW 30 kHz Sweep 13.40 ms (601 pts)</p>	 <p>Marker 1 1.910533333333 GHz</p> <p>Mkr1 1.910.533 GHz -30.966 dBm</p> <p>Ref Offset 6.6 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 1.910000 GHz #Res BW 30 kHz #VBW 30 kHz Sweep 13.40 ms (601 pts)</p>
UMTS-FDD Band II - Low Channel	UMTS-FDD Band II - High Channel
<p>Note: Offset=Cable loss (4.5) + 10log</p> $(48.71/30)=4.5+2.1=6.6 \text{ dB}$	<p>Note: Offset=Cable loss (4.5) + 10log</p> $(48.48/30)=4.5+2.1=6.6 \text{ dB}$

## 6.8 Frequency Stability

Temperature	24°C
Relative Humidity	52%
Atmospheric Pressure	1019mbar
Test date :	October 19, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §24.235	a)	<p>According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:</p> <p>Frequency Tolerance for Transmitters in the Public Mobile Services</p> <table border="1"> <thead> <tr> <th>Frequency Range (MHz)</th> <th>Base, fixed (ppm)</th> <th>Mobile ≤ 3 watts (ppm)</th> <th>Mobile ≤ 3 watts (ppm)</th> </tr> </thead> <tbody> <tr> <td>25 to 50</td> <td>20.0</td> <td>20.0</td> <td>50.0</td> </tr> <tr> <td>50 to 450</td> <td>5.0</td> <td>5.0</td> <td>50.0</td> </tr> <tr> <td>45 to 512</td> <td>2.5</td> <td>5.0</td> <td>.0</td> </tr> <tr> <td>821 to 896</td> <td>1.5</td> <td>2.5</td> <td>2.5</td> </tr> <tr> <td>928 to 29.</td> <td>5.0</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>929 to 960.</td> <td>1.5</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>2110 to 2220</td> <td>10.0</td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table> <p>According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.</p>	Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)	25 to 50	20.0	20.0	50.0	50 to 450	5.0	5.0	50.0	45 to 512	2.5	5.0	.0	821 to 896	1.5	2.5	2.5	928 to 29.	5.0	N/A	N/A	929 to 960.	1.5	N/A	N/A	2110 to 2220	10.0	N/A	N/A	<input checked="" type="checkbox"/>
Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)																																
25 to 50	20.0	20.0	50.0																																
50 to 450	5.0	5.0	50.0																																
45 to 512	2.5	5.0	.0																																
821 to 896	1.5	2.5	2.5																																
928 to 29.	5.0	N/A	N/A																																
929 to 960.	1.5	N/A	N/A																																
2110 to 2220	10.0	N/A	N/A																																
Test setup																																			

Procedure	A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage.  Limit: The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

**GSM Voice:**
**Cellular Band (Part 22H) result**

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	20	0.0239	2.5
0		20	0.0239	2.5
10		14	0.0167	2.5
20		16	0.0191	2.5
30		15	0.0179	2.5
40		19	0.0227	2.5
50		20	0.0239	2.5
55		19	0.0227	2.5
25		4.2	0.0227	2.5
	3.5	20	0.0239	2.5

**PCS Band (Part 24E) result**

Middle Channel, $f_0 = 1880$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	10	0.0053	2.5
0		13	0.0069	2.5
10		15	0.0080	2.5
20		11	0.0059	2.5
30		15	0.0080	2.5
40		16	0.0085	2.5
50		12	0.0064	2.5
55		14	0.0074	2.5
25		4.2	0.0096	2.5
	3.5	18	0.0096	2.5

RMC:

**UMTS-FDD Band V (Part 22H)**

Middle Channel, $f_0 = 835$ MHz				
Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	15	0.0180	2.5
0		13	0.0156	2.5
10		14	0.0168	2.5
20		13	0.0156	2.5
30		11	0.0132	2.5
40		10	0.0120	2.5
50		15	0.0180	2.5
55		17	0.0204	2.5
25	4.2	11	0.0132	2.5
	3.5	19	0.0228	2.5

**UMTS-FDD Band II (Part 24E)**

Middle Channel, $f_0 = 1880$ MHz				
Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	20	0.0106	2.5
0		9	0.0048	2.5
10		10	0.0053	2.5
20		12	0.0064	2.5
30		14	0.0074	2.5
40		13	0.0069	2.5
50		12	0.0064	2.5
55		14	0.0074	2.5
25	4.2	15	0.0080	2.5
	3.5	18	0.0096	2.5

## Annex A. TEST INSTRUMENT

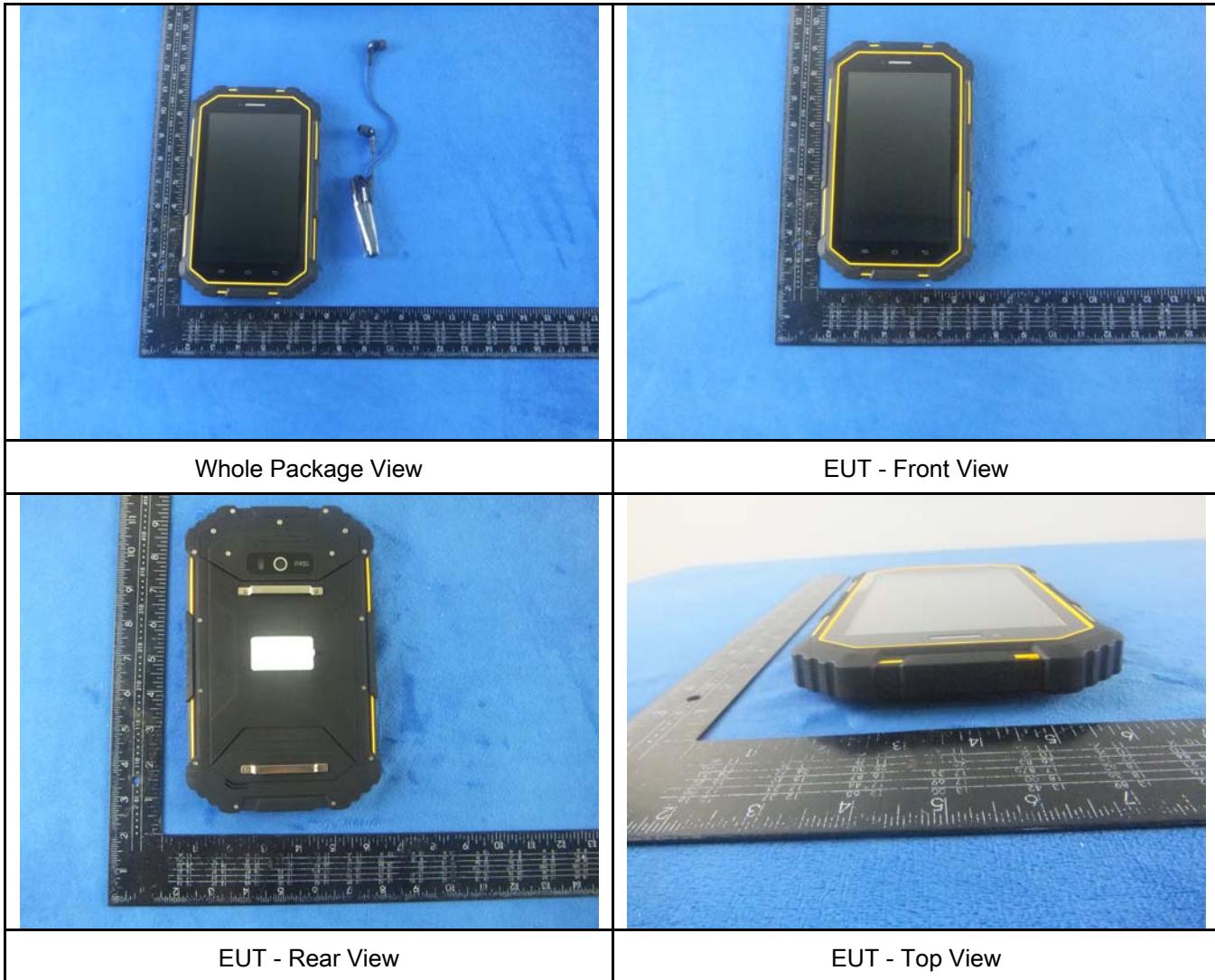
Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/15/2016	09/14/2017	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/24/2016	09/23/2017	<input checked="" type="checkbox"/>
Temperature/Humidity Chamber	UHL-270	001	10/08/2016	10/07/2017	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/20/2016	09/19/2017	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/23/2016	09/22/2017	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	<input checked="" type="checkbox"/>
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
Power Amplifier	SMC150D	R1553-0313	03/09/2016	03/08/2017	<input checked="" type="checkbox"/>
Power Amplifier	S41-25D	R1553-0314	05/27/2016	05/26/2017	<input checked="" type="checkbox"/>
Tunable Notch Filter	3NF-800/1000-S	AA4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>

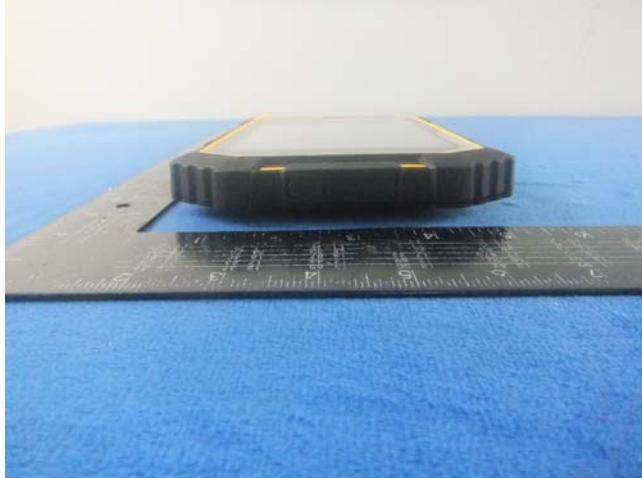
Test Report	16071169-FCC-R1
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Tunable Notch Filter	3NF- 1000/2000-S	AM 4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
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## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo





EUT - Bottom View

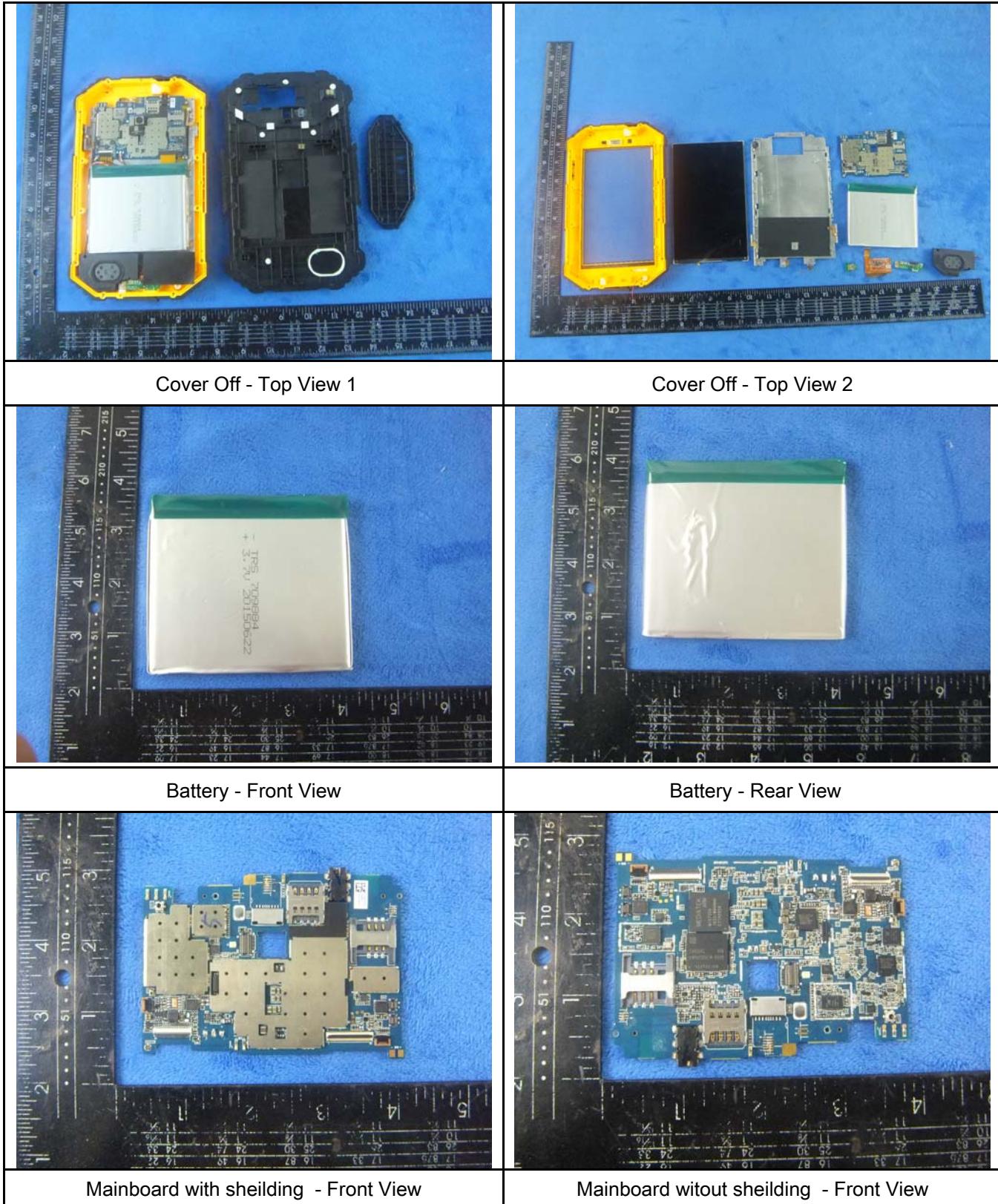


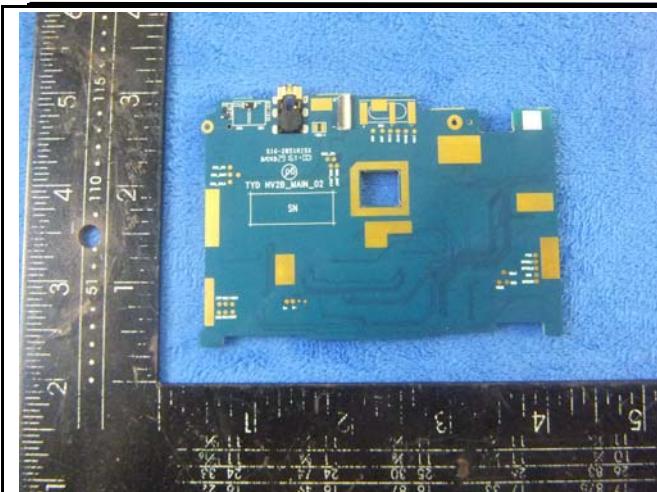
EUT - Left View



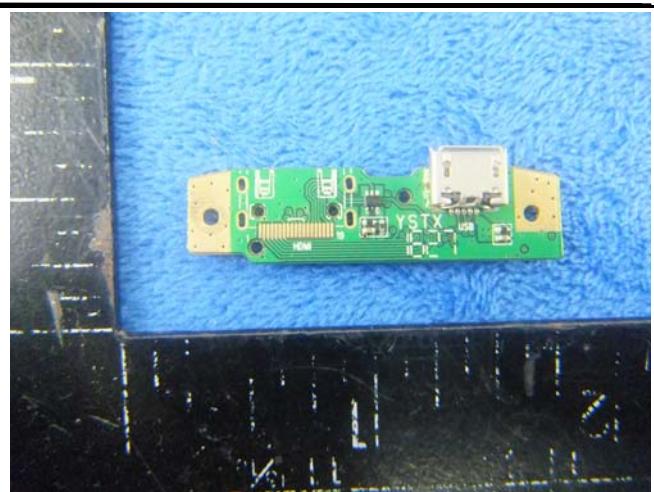
EUT - Right View

### Annex B.ii. Photograph: EUT Internal Photo

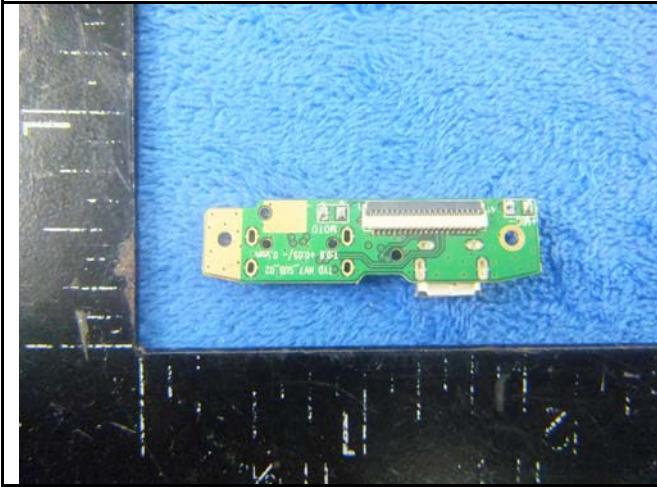




Mainboard – Rear View



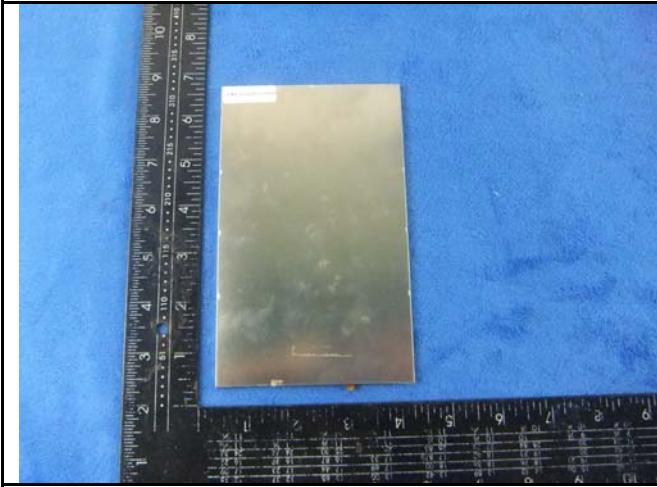
USB board – Front View



USB board - Rear View



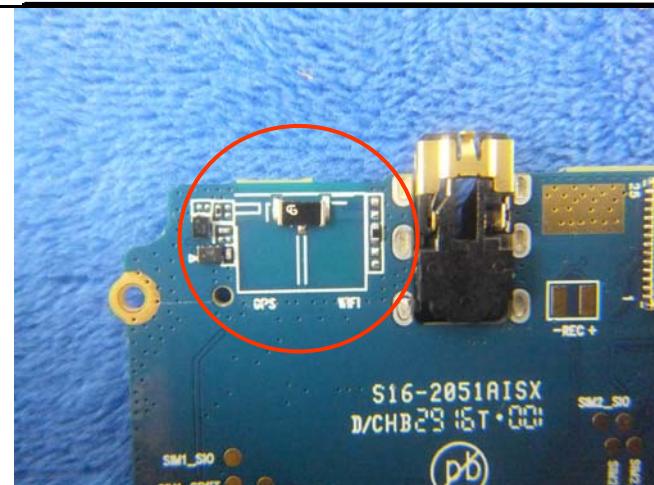
LCD – Feont View



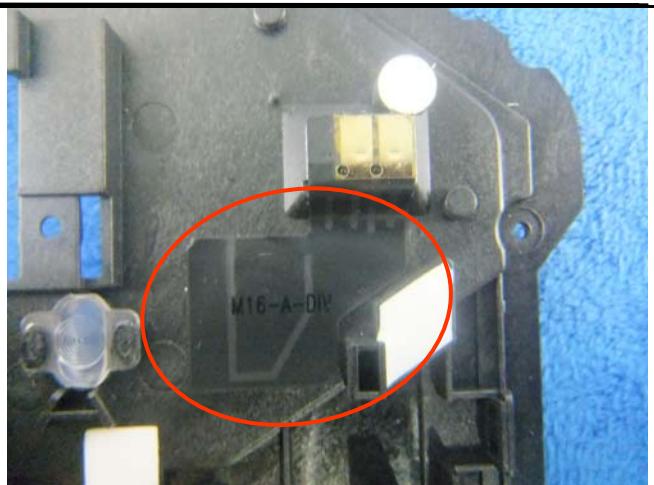
LCD – Rear View



GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE/GPS - Antenna View

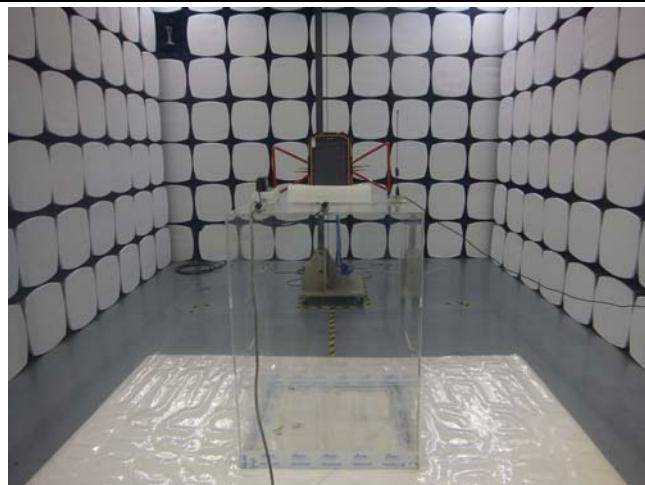


LTE Antenna View

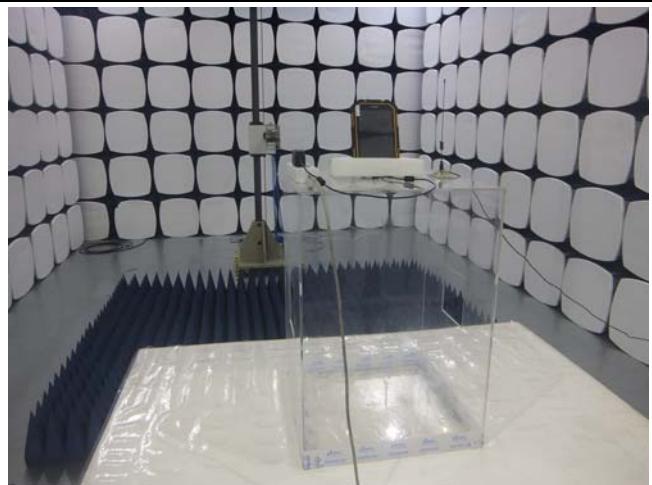


NFC - Antenna View

Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz

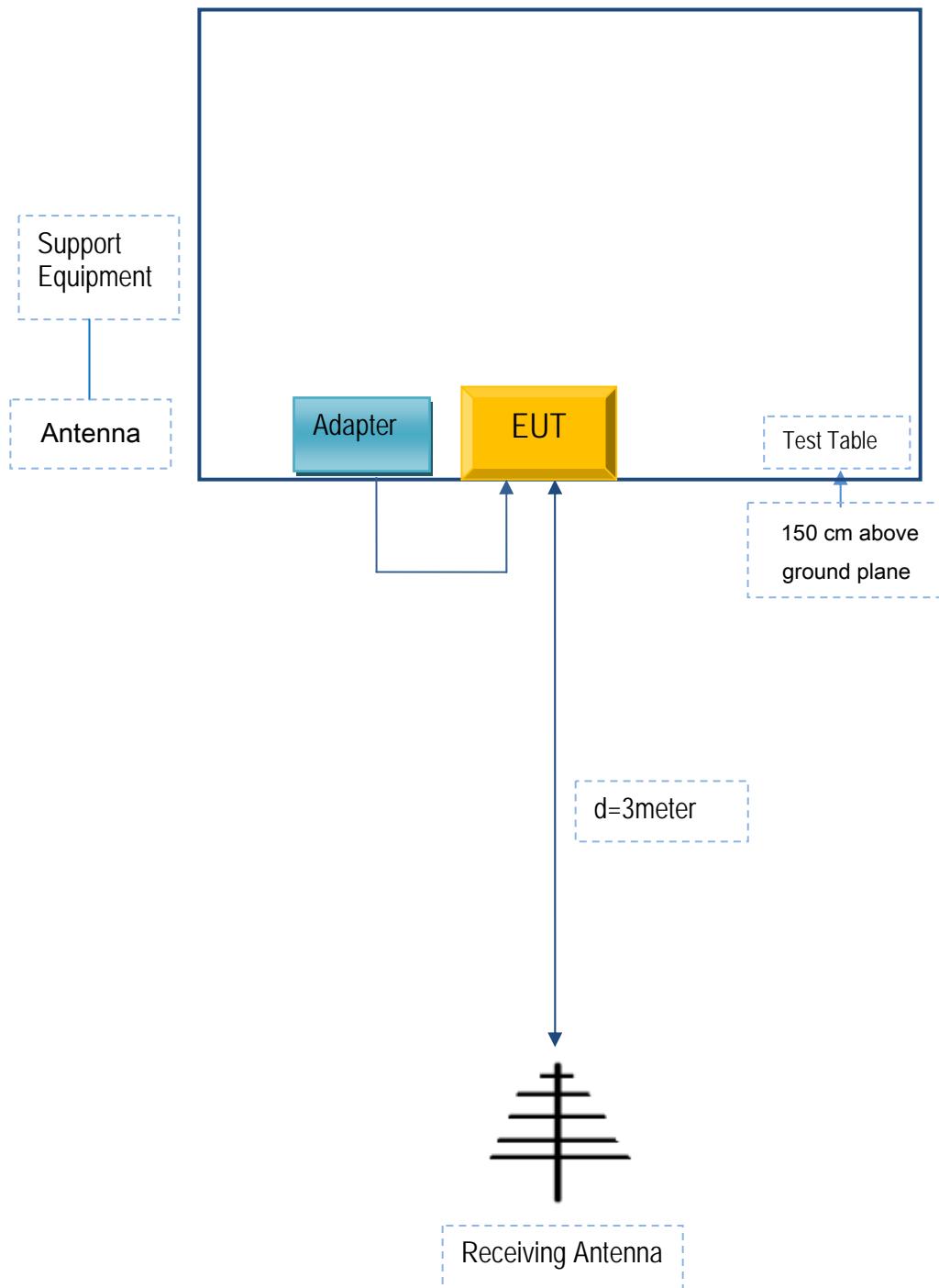


Radiated Spurious Emissions Test Setup Above 1GHz

## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions



## Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

### Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	AC Adapter	42T4416	21D9JU

### Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	GT211032

## Annex C.ii. EUT OPERATING CONDITIONS

N/A

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## Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see the attachment

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## Annex E. DECLARATION OF SIMILARITY

N/A