



FCC 47 CFR PART 22 subpart H

FCC 47 CFR PART 24 subpart E

**CERTIFICATION TEST REPORT**

*For*

**Smart Suitcase S1  
MODEL NUMBER: CWL16S1**

**FCC ID: 2AIUOCWL16S1**

**REPORT NUMBER: 4787496523-1**

**ISSUE DATE: February 15, 2017**

*Prepared for*

**Cowa Robotic Co., Ltd  
5F, Building 64, No 421, Hongcao Road, Shanghai, China**

*Prepared by*

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch  
Room 101, Building 10, Innovation Technology Park,  
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China**  
**Tel: +86 769 33871725  
Fax: +86 769 33871725  
Website: [www.ul.com](http://www.ul.com)**

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/15/17	Initial Issue	

Summary of Test Results			
Standard(s) Section	Description	Requirements	Result
FCC §2.1046, §22.913, §24.232	Effective(Isotropic) Radiated Power of Transmitter	FCC: ERP ≤ 2 W	PASS
§22.913 §24.232(b)	Conducted Power of Transmitter	N/A	PASS
§24.232(d)	Peak to Average Radio	≤13dB	PASS
§2.1049(h), §22.917, §24.238	Occupied Bandwidth	OBW: No limit EBW: No limit	PASS
§2.1051, §22.917, §24.238	Band Edge Compliance	≤ 43+10log <sub>10</sub> (P[W])/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	PASS
§2.1051, §22.917, §24.238	Spurious Emission at Antenna Terminal	≤ 43+10log <sub>10</sub> (P[W])/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	PASS
§2.1053, §22.917, §24.238	Radiated Spurious Emissions	≤ 43+10log <sub>10</sub> (P[W])	PASS
§2.1055, §22.355, §24.235	Frequency Stability	≤ ±2.5ppm	PASS

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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Cowa Robotic Co., Ltd

Address: 5F, Building 64, No 421, Hongcao Road, Shanghai, China

### Manufacturer Information

Company Name: Cowa Robotic Co., Ltd

Address: 5F, Building 64, No 421, Hongcao Road, Shanghai, China

### EUT Description

Product Name Smart Suitcase S1  
Brand Name N/A  
Model Name CWL16S1  
FCC ID 2AIUOCWL16S1  
Date Tested December 16, 2016 ~ February 13, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR PART 22 Subpart H	PASS
FCC 47 CFR PART 24 Subpart E	PASS

Tested By:

Denny Huang  
Engineer Project Associate  
Approved By:

Stephen Guo  
Laboratory Manager

Check By:

Shawn Wen  
Laboratory Leader

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-D (2010) & KDB971168, FCC CFR 47 Part 2, Part 22 and Part 24.

## 3. FACILITIES AND ACCREDITATION

Test Location	Dongguan Dongdian Testing Service Co., Ltd
Address	No. 17, Zongbu Road 2, Songshan Lake Sci&Tech Park, Dongguan City, Guangdong Province, 523808, China
Accreditation Certificate	<p>Dongguan Dongdian Testing Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until January 31, 2018.</p> <p>Dongguan Dongdian Testing Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 270092, Renewal date March 11, 2015, valid time is until March 11, 2018.</p> <p>The 3m Alternate Test Site of Dongguan Dongdian Testing Service Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 10288A on April 23, 2015, valid time is until April 23, 2018.</p>

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	3.32dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 26GHz)( include Fundamental emission)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
	3.54dB (18GHz-26Gz)
Bandwidth	1.1%
Stop Transmitting Time Test	0.6%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

Equipment	Smart Suitcase S1		
Model Name	CWL16S1		
Emissions Designation	GPRS	246KGXW	
	EDGE	246KG7W	
	WCDMA	4M10F9W	
Battery	DC 14.4V, 4200mA		
Power Adapter	Input: AC 100~240V, 50/60Hz Output: DC 16.8V 1400mA		

### 5.2. TECHNICAL INFORMATION

Frequency Bands	<input type="checkbox"/> GSM 850	824 ~849MHz (Uplink) 869~894MHz (Downlink)	<input type="checkbox"/> PCS 1900	1850 ~1910Hz (Uplink) 1930~1990MHz (Downlink)		
	<input checked="" type="checkbox"/> GPRS 850		<input checked="" type="checkbox"/> GPRS 1900			
	<input checked="" type="checkbox"/> EDGE 850		<input checked="" type="checkbox"/> EDGE 1900			
Modulation Mode	GSM/ GPRS		GMSK			
	EDGE		8PSK			
Power Class	GSM 850	4	PCS 1900	1		
GSM Release Version	GSM Release 99					
Multislot Class	GPRS	12	EDGE	12		
HSCSD Multislot MS	<input type="checkbox"/> Support		<input checked="" type="checkbox"/> Not Support			
R-GSM MS	<input type="checkbox"/> Support		<input checked="" type="checkbox"/> Not Support			

Frequency Bands	<input checked="" type="checkbox"/> WCDMA Band II <input checked="" type="checkbox"/> WCDMA Band V	1850 MHz ~ 1910 MHz (Uplink)	
		1930 MHz ~ 1990 MHz (Downlink)	
Modulation Mode	QPSK		824 MHz ~ 849 MHz (Uplink)
			869 MHz ~ 894 MHz (Downlink)
WCDMA Release Version	WCDMA Release 99		
HSDPA Release Version	Release 5	HSUPA Release Version	Release 6

## 5.1. MAXIMUM OUTPUT POWER

GSM850	Average Power [dBm]		
Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
GPRS (GMSK, 1 Tx slot)	31.56	31.71	31.73
GPRS (GMSK, 2 Tx slots)	30.85	30.77	30.46
GPRS (GMSK, 3 Tx slots)	28.95	29.05	28.84
GPRS (GMSK, 4 Tx slots)	27.03	26.96	26.85
EDGE (8PSK, 1 Tx slot)	25.96	25.66	25.97
EDGE (8PSK, 2 Tx slot)	24.76	24.69	24.88
EDGE (8PSK, 3 Tx slot)	22.77	22.44	22.65
EDGE (8PSK, 4 Tx slot)	20.35	20.55	20.63

GSM1900	Average Power [dBm]		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
GPRS (GMSK, 1 Tx slot)	29.56	29.87	30.01
GPRS (GMSK, 2 Tx slots)	27.15	27.50	27.55
GPRS (GMSK, 3 Tx slots)	25.66	25.83	25.87
GPRS (GMSK, 4 Tx slots)	23.41	23.69	23.74
EDGE (8PSK, 1 Tx slot)	25.24	25.11	25.49
EDGE (8PSK, 2 Tx slot)	24.46	24.86	24.57
EDGE (8PSK, 3 Tx slot)	22.59	22.66	22.52
EDGE (8PSK, 4 Tx slot)	20.46	20.33	21.78

Band :WCDMA Band V	Average Power [dBm]		
Channel	4,132	4,182	4,233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.37	23.29	23.23
HSDPA Subtest-1	22.33	22.15	22.65
HSDPA Subtest-2	21.27	21.45	21.76
HSDPA Subtest-3	22.47	23.74	22.25
HSDPA Subtest-4	22.22	23.33	22.16
HSUPA Subtest-1	22.47	23.27	23.64
HSUPA Subtest-2	21.69	22.25	21.87
HSUPA Subtest-3	21.23	21.84	21.55
HSUPA Subtest-4	22.43	21.15	21.61

Band: WCDMA Band II	Average Power [dBm]		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	23.66	23.66	23.49
HSDPA Subtest-1	22.27	23.57	22.72
HSDPA Subtest-2	21.56	22.65	21.12
HSDPA Subtest-3	22.35	22.75	21.55
HSDPA Subtest-4	22.98	22.55	21.21
HSUPA Subtest-1	22.76	22.35	22.76
HSUPA Subtest-2	21.46	21.89	20.67
HSUPA Subtest-3	21.37	21.56	20.55
HSUPA Subtest-4	21.22	22.35	21.45

## 5.2. OPERATING CONDITION OF EUT

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).

Test Mode	Test Modes Description
GSM/TM1	GSM system, GPRS, GMSK modulation
GSM/TM2	GSM system, EDGE, 8PSK Modulation
UMTS/TM1	UMTS system, WCDMA, QPSK modulation

Note: If no any other statement, UMTS/TM1 shall be used RCM 12.2K mode.

## 5.3. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	25 °C
Voltage :	VL	12.9V
	VN	14.4V
	VH	15.8V

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature

#### 5.4. TEST CHANNEL LIST

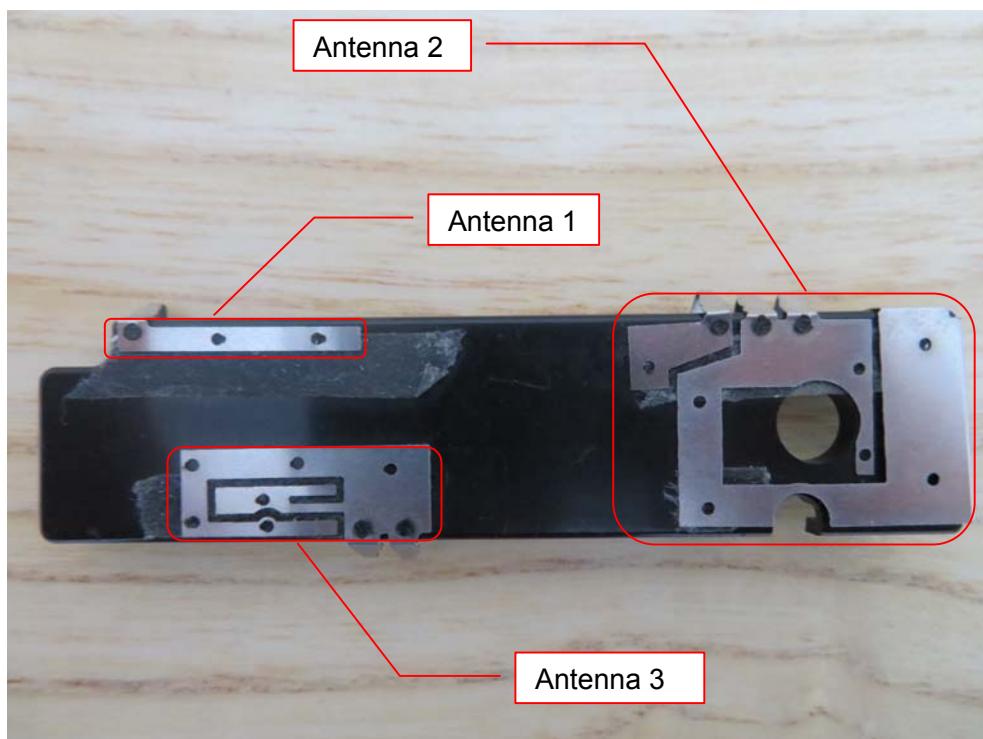
Band	Channel	Frequency	
		Channel Number	(MHz)
GPRS 850/EDGE 850	Low	128	824.2
	Mid	190	836.6
	High	251	848.8

Band	Channel	Frequency	
		Channel Number	(MHz)
GPRS 1900/EDGE 1900	Low	512	1850.2
	Mid	661	1880.0
	High	810	1909.8

Bands	Channel	Frequency	
		Channel Number	(MHz)
WCDMA Band 2	Low	9262	1852.4
	Mid	9400	1880.0
	High	9538	1907.6
WCDMA Band 5	Low	4132	826.4
	Mid	4182	836.4
	High	4233	846.6

## 5.5. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
2	GPRS/EDGE 850	PCB Antenna	1.74
	GPRS/EDGE 1900	PCB Antenna	2.33
	WCDMA Band II	PCB Antenna	2.33
	WCDMA Band V	PCB Antenna	1.74



## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	N/A	N/A	N/A	N/A

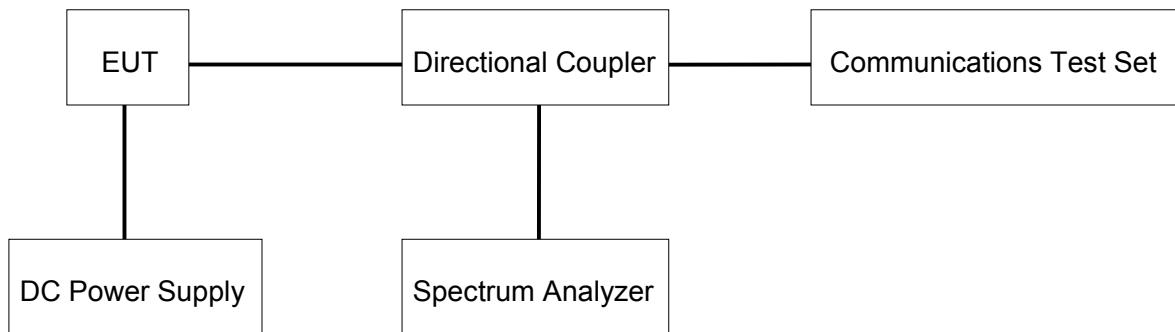
### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB out	USB	Unshielded	N/A	N/A

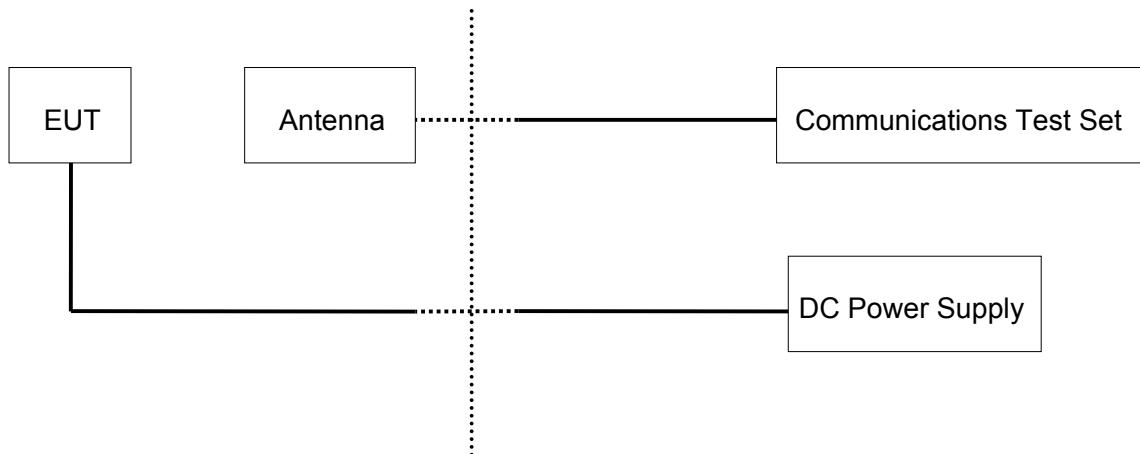
### ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	Power Adapter	N/A	N/A	Input: AC 100~240V, 50/60Hz Output: DC 16.8V 1400mA

### CONDUCTED TEST SETUP



**RADIATED TEST SETUP**



## 5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Instrument (Conducted for RF Port)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030	MY55410512	2016/12/20	1 Year
<input checked="" type="checkbox"/>	Wideband Radio Communication tester	R&S	CMW500	155523	2016/12/20	1 Year
Instrument (Radiated Tests)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESU8	100316	2016/10/16	1 Year
<input checked="" type="checkbox"/>	Spectrum analyzer	R&S	FSU26	1166.1660.26	2016/10/16	1 Year
<input checked="" type="checkbox"/>	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2016/10/27	1 Year
<input checked="" type="checkbox"/>	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2016/10/27	1 Year
<input checked="" type="checkbox"/>	Double Ridged Horn Antenna	R&S	HF907	100276	2016/10/12	1 Year
<input checked="" type="checkbox"/>	Pre-amplifier	A.H.	PAM-0118	360	2016/10/16	1 Year
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X2	W11.03	2016/10/16	1 Year
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X1	W12.02	2016/10/16	1 Year
<input checked="" type="checkbox"/>	MI Cable	HUBSER	C10-01-01-1M	1091629	2016/10/16	1 Year
<input checked="" type="checkbox"/>	Test software	Audix	E3	V 6.11111b	N/A	N/A
Instrument (Line Conducted Emission (AC Main))						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESU8	100316	2016/10/16	1 Year
<input checked="" type="checkbox"/>	LISN 1	R&S	ENV216	101109	2016/10/16	1 Year
<input checked="" type="checkbox"/>	LISN 2	R&S	ESH2-Z5	100309	2016/10/16	1 Year
<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	101242	2016/10/16	1 Year
<input checked="" type="checkbox"/>	CE Cable 1	HUBSER	ESU8/RF2	W10.01	2016/10/16	1 Year
<input checked="" type="checkbox"/>	Test software	Audix	E3	V 6.11111b	N/A	N/A
Other Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	DC Power Supply	Array	3662A	A1512015	2016/12/20	1 Year
<input checked="" type="checkbox"/>	Temperature & Humidity Chamber	SANMOOD	SG-80-CC-2	2088	Mar.01,2016	1 Year

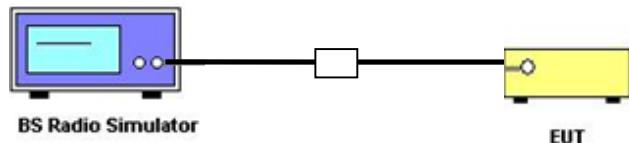
## 6. FCC PART 2, PART 22H/24E REQUIREMENTS

### 6.1 CONDUCTED RF OUTPUT POWER

#### REQUIREMENT

For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of the dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

#### TEST SETUP



#### TEST PROCEDURES

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

### TEST RESULTS

#### GSM 850MHz Conducted Power Test Verdict

Test Mode	Conducted Power(dBm)		
	Channel 128	Channel 190	Channel 251
	Average	Average	Average
GSM/TM1(1 Slot) (GPRS)	31.56	31.71	31.73
GSM/TM1(2 Slot) (GPRS)	30.85	30.77	30.46
GSM/TM1(3 Slot) (GPRS)	28.95	29.05	28.84
GSM/TM1(4 Slot) (GPRS)	27.03	26.96	26.85
GSM/TM2 (1 Slot) (EDGE)	25.96	25.66	25.97
GSM/TM2 (2 Slot) (EDGE)	24.76	24.69	24.88
GSM/TM2 (3 Slot) (EDGE)	22.77	22.44	22.65
GSM/TM2(4 Slot) (EDGE)	20.35	20.55	20.63

#### GSM1900MHz Conducted Power Test Verdict

Test Mode	Conducted Power(dBm)		
	Channel 512	Channel 661	Channel 810
	Average	Average	Average
GSM/TM1(1 Slot) (GPRS)	29.56	29.87	30.01
GSM/TM1(2 Slot) (GPRS)	27.15	27.50	27.55
GSM/TM1(3 Slot) (GPRS)	25.66	25.83	25.87
GSM/TM1(4 Slot) (GPRS)	23.41	23.69	23.74
GSM/TM2(1 Slot) (EDGE)	25.24	25.11	25.49
GSM/TM2(2 Slot) (EDGE)	24.46	24.86	24.57
GSM/TM2(3 Slot) (EDGE)	22.59	22.66	22.52
GSM/TM2(4 Slot) (EDGE)	20.46	20.33	21.78

WCDMA Band II Conducted Power Test Verdict

Test Mode	Conducted Power(dBm)		
	Channel 9262	Channel 9400	Channel 9538
	Average	Average	Average
UMTS/TM1 (RMC 12.2K)	23.37	23.29	23.23
UMTS/TM1 (HSDPA Subtest-1)	22.33	22.15	22.65
UMTS/TM1 (HSDPA Subtest-2)	21.27	21.45	21.76
UMTS/TM1 (HSDPA Subtest-3)	22.47	23.74	22.25
UMTS/TM1 (HSDPA Subtest-4)	22.22	23.33	22.16
UMTS/TM1 (HSUPA Subtest-1)	22.47	23.27	23.64
UMTS/TM1 (HSUPA Subtest-2)	21.69	22.25	21.87
UMTS/TM1 (HSUPA Subtest-3)	21.23	21.84	21.55
UMTS/TM1 (HSUPA Subtest-4)	22.43	21.15	21.61

WCDMA Band V Conducted Power Test Verdict

Test Mode	Conducted Power(dBm)		
	Channel 4132	Channel 4183	Channel 4233
	Average	Average	Average
UMTS/TM1 (RMC 12.2K)	23.66	23.66	23.49
UMTS/TM1 (HSDPA Subtest-1)	22.27	23.57	22.72
UMTS/TM1 (HSDPA Subtest-2)	21.56	22.65	21.12
UMTS/TM1 (HSDPA Subtest-3)	22.35	22.75	21.55
UMTS/TM1 (HSDPA Subtest-4)	22.98	22.55	21.21
UMTS/TM1 (HSUPA Subtest-1)	22.76	22.35	22.76
UMTS/TM1 (HSUPA Subtest-2)	21.46	21.89	20.67
UMTS/TM1 (HSUPA Subtest-3)	21.37	21.56	20.55
UMTS/TM1 (HSUPA Subtest-4)	21.22	22.35	21.45

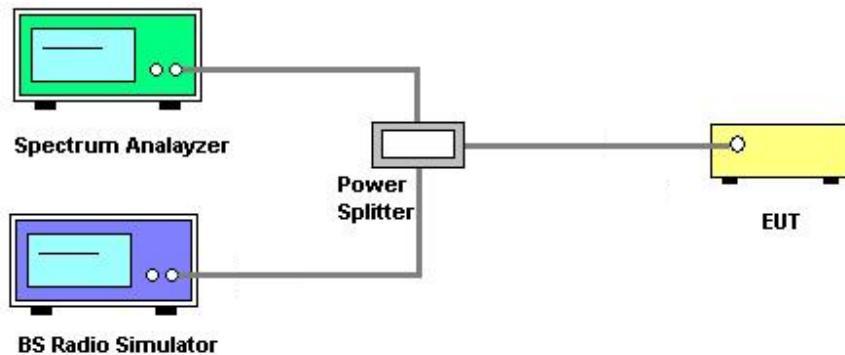
## 6.2 PEAK TO AVERAGE RADIO

### DEFINITION

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level.

Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

### TEST SETUP



### TEST PROCEDURES

1. The EUT was connected to spectrum and system simulator via a power divider.
2. For UMTS signals, set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

## TEST RESULTS

Test Result of GSM 850MHz Test Verdict:

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM 850	GSM/TM1	Channel 128	0.21	13	PASS
		Channel 190	0.22	13	PASS
		Channel 251	0.23	13	PASS
	GSM/TM2	Channel 128	2.98	13	PASS
		Channel 190	2.95	13	PASS
		Channel 251	2.90	13	PASS

Test Result of GSM 1900MHz Test Verdict:

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM 1900	GSM/TM1	Channel 510	0.22	13	PASS
		Channel 661	0.24	13	PASS
		Channel 810	0.23	13	PASS
	GSM/TM2	Channel 510	2.95	13	PASS
		Channel 661	2.84	13	PASS
		Channel 810	2.99	13	PASS

Test Result of WCDMA Band II Test Verdict:

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA II	UMTS/TM1	Channel 9262	2.45	13	PASS
		Channel 9400	2.73	13	PASS
		Channel 9530	2.34	13	PASS

Test Result of WCDMA Band V Test Verdict:

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA V	UMTS/TM1	Channel 4132	3.21	13	PASS
		Channel 4183	3.39	13	PASS
		Channel 4233	3.29	13	PASS

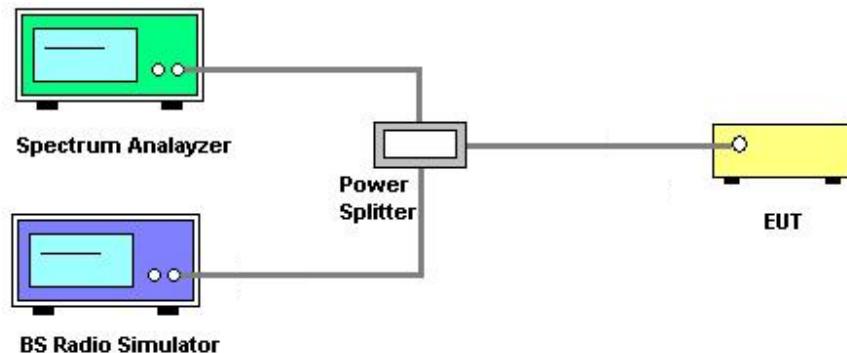
## 6.3 99% OCCUPIED BANDWIDTH AND 26DB BANDWIDTH

### DEFINITION

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### TEST SETUP



### TEST PROCEDURES

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

### TEST RESULT

Test Result of GSM 850MHz Test Verdict:

Test Band	Test Mode	Test Channel	99% OBW (KHz)	-26dBc Bandwidth(KHz)
GSM 850	GSM/TM1	Channel 128	245.84	315.85
		Channel 190	246.13	317.25
		Channel 251	245.03	314.68
	GSM/TM2	Channel 128	243.89	303.00
		Channel 190	242.99	310.73
		Channel 251	245.55	307.47

Test Result of GSM 1800MHz Test Verdict:

Test Band	Test Mode	Test Channel	99% OBW (KHz)	-26dBc Bandwidth(KHz)
GSM 1900	GSM/TM1	Channel 510	246.01	317.84
		Channel 661	244.23	313.32
		Channel 810	244.96	312.07
	GSM/TM2	Channel 510	245.42	310.07
		Channel 661	246.30	313.47
		Channel 810	247.48	316.62

Test Result of WCDMA Band II Test Verdict:

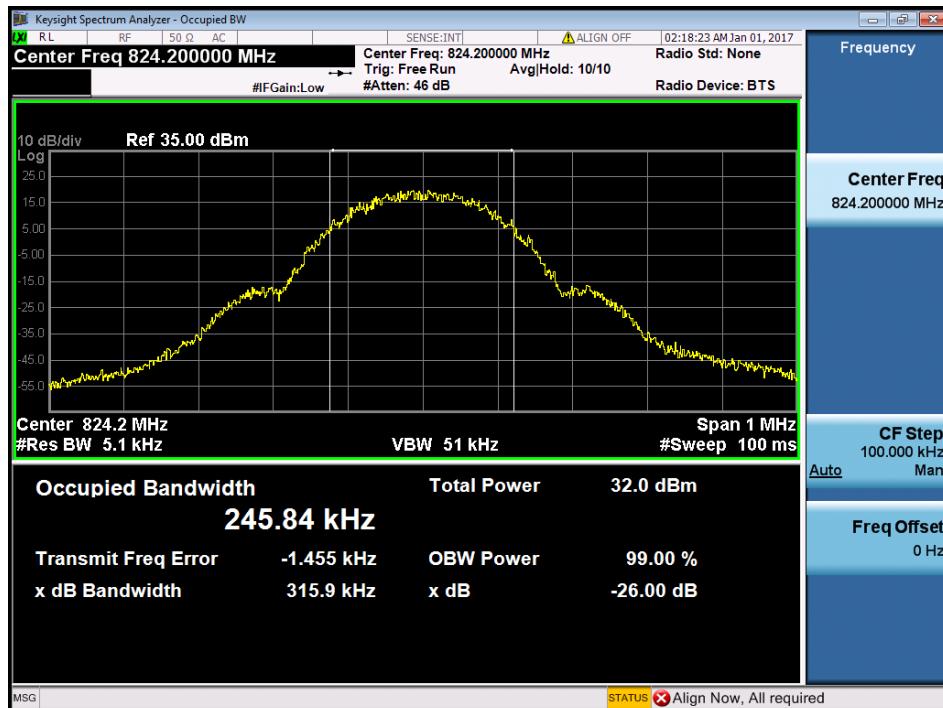
Test Band	Test Mode	Test Channel	99% OBW (MHz)	-26dBc Bandwidth(MHz)
WCDMA II	UMTS/TM1	Channel 9262	4.0922	4.660
		Channel 9400	4.1026	4.670
		Channel 9530	4.0877	4.662

Test Result of WCDMA Band V Test Verdict:

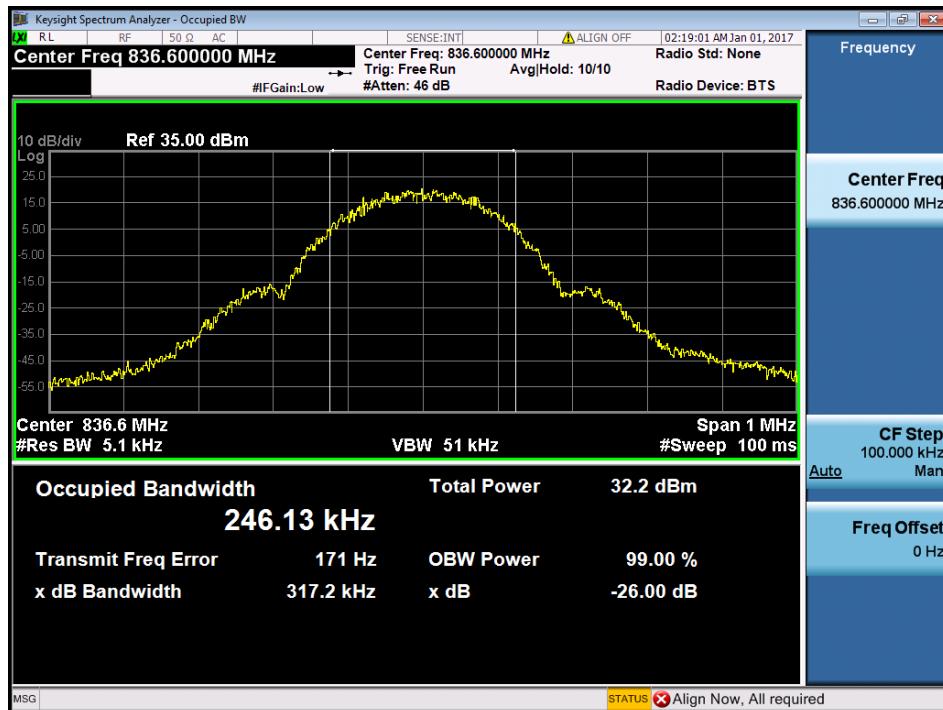
Test Band	Test Mode	Test Channel	99% OBW (MHz)	-26dBc Bandwidth(MHz)
WCDMA V	UMTS/TM1	Channel 4132	4.0976	4.645
		Channel 4183	4.0929	4.649
		Channel 4233	4.0959	4.629

**TEST RESULT (PLOTS)**

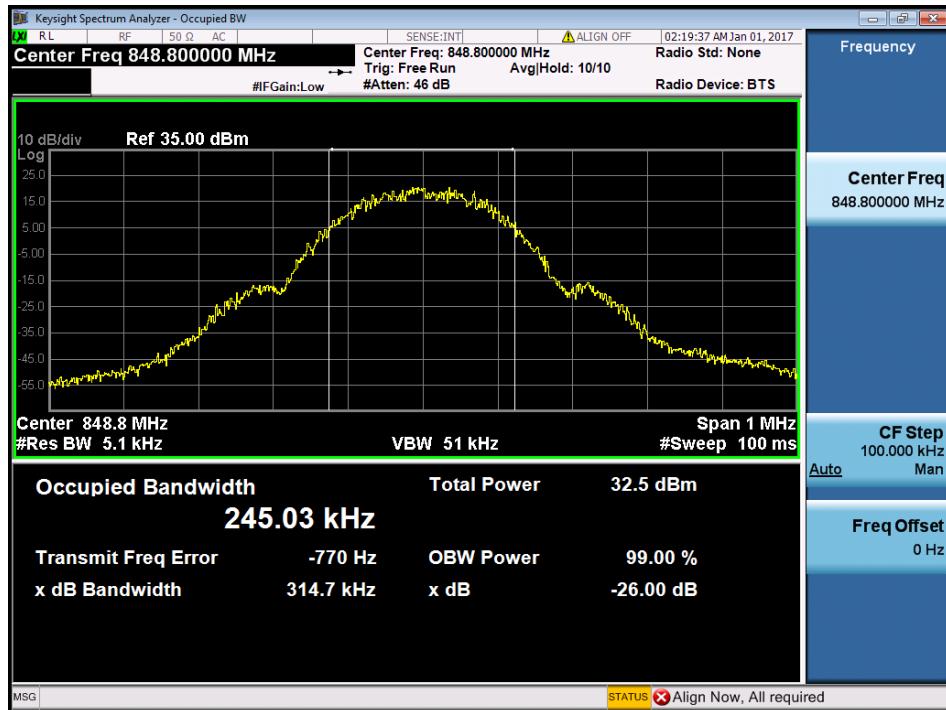
Band	GSM 850MHz	Test Mode	GSM/TM1	Channel	Low
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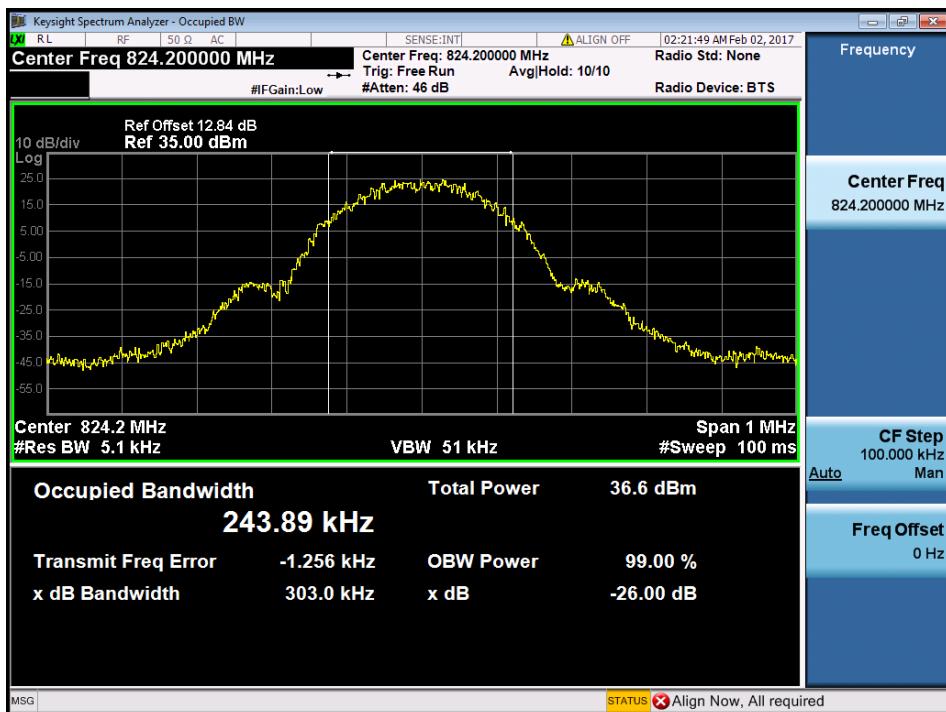
Band	GSM 850MHz	Test Mode	GSM/TM1	Channel	Mid
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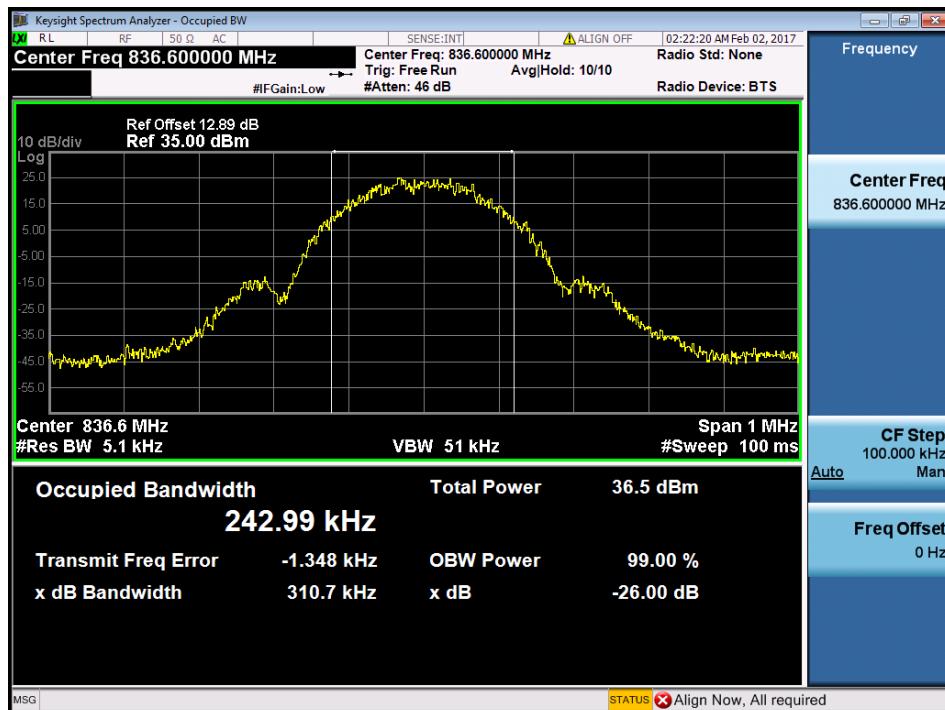
Band	GSM 850MHz	Test Mode	GSM/TM1	Channel	High
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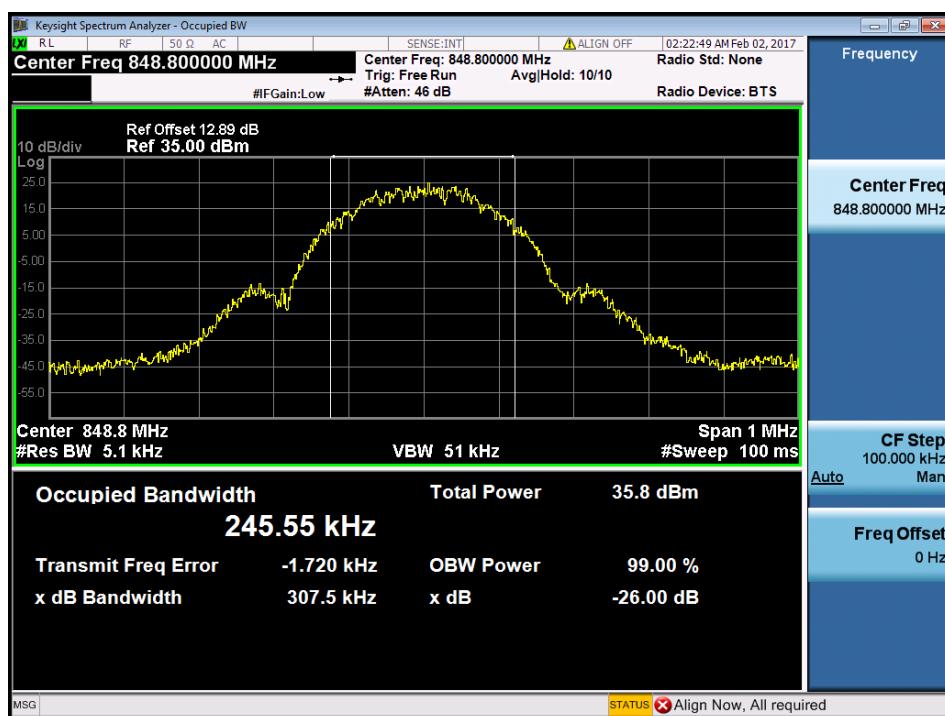
Band	GSM 850MHz	Test Mode	GSM/TM2	Channel	Low
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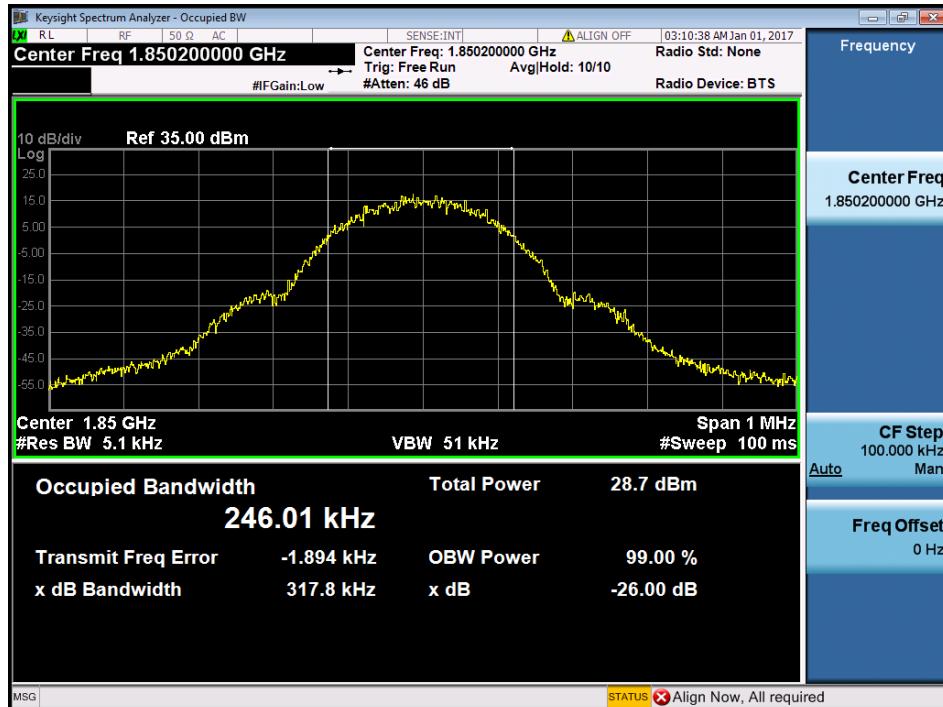
Band	GSM 850MHz	Test Mode	GSM/TM2	Channel	Mid
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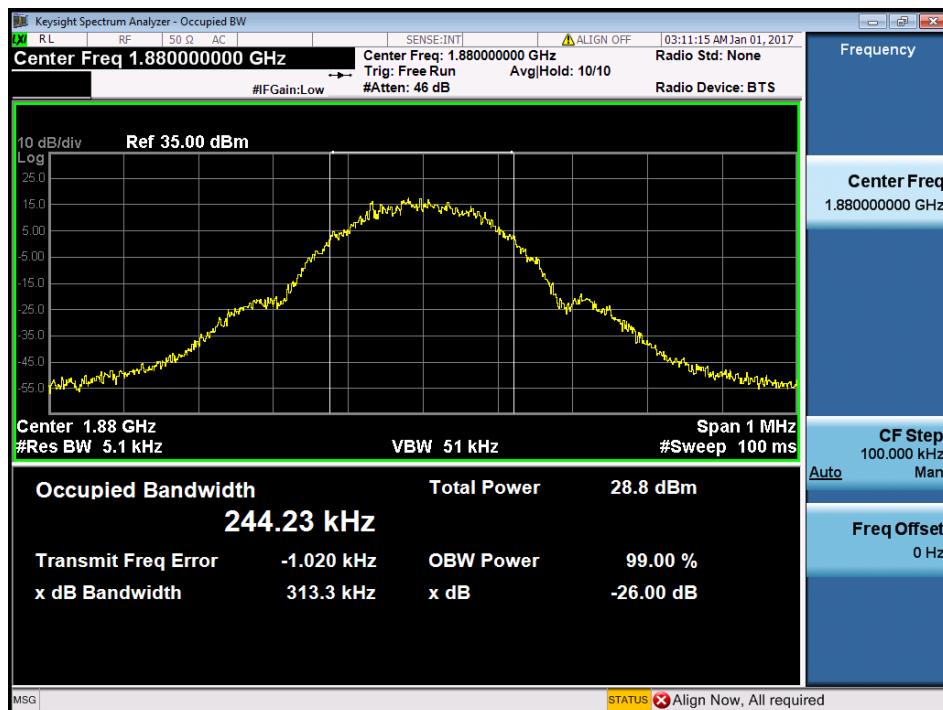
Band	GSM 850MHz	Test Mode	GSM/TM2	Channel	High
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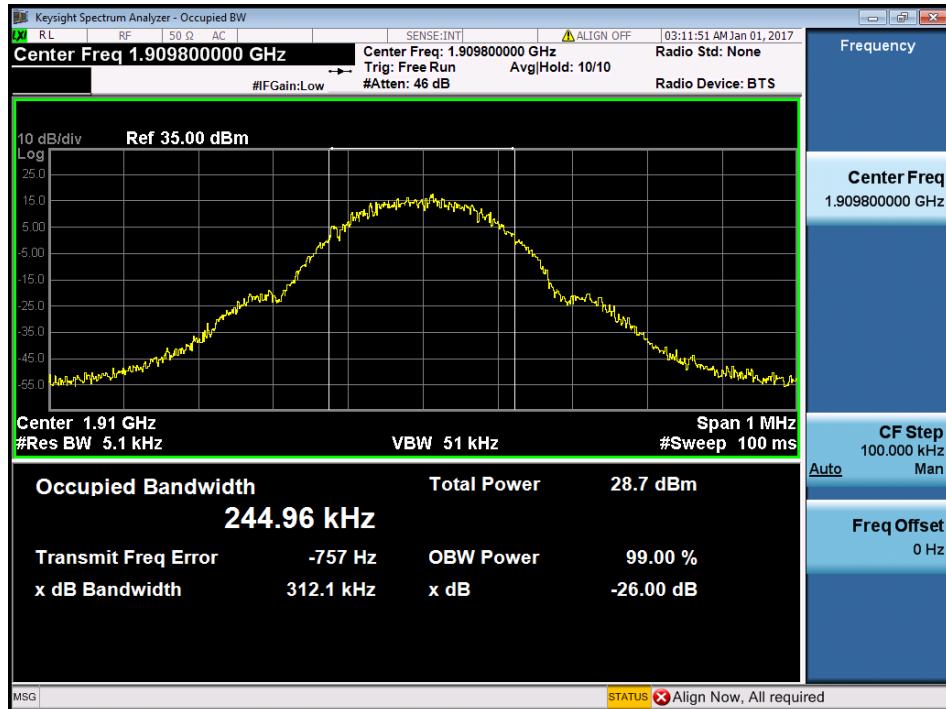
Band	GSM 1900MHz	Test Mode	GSM/TM1	Channel	Low
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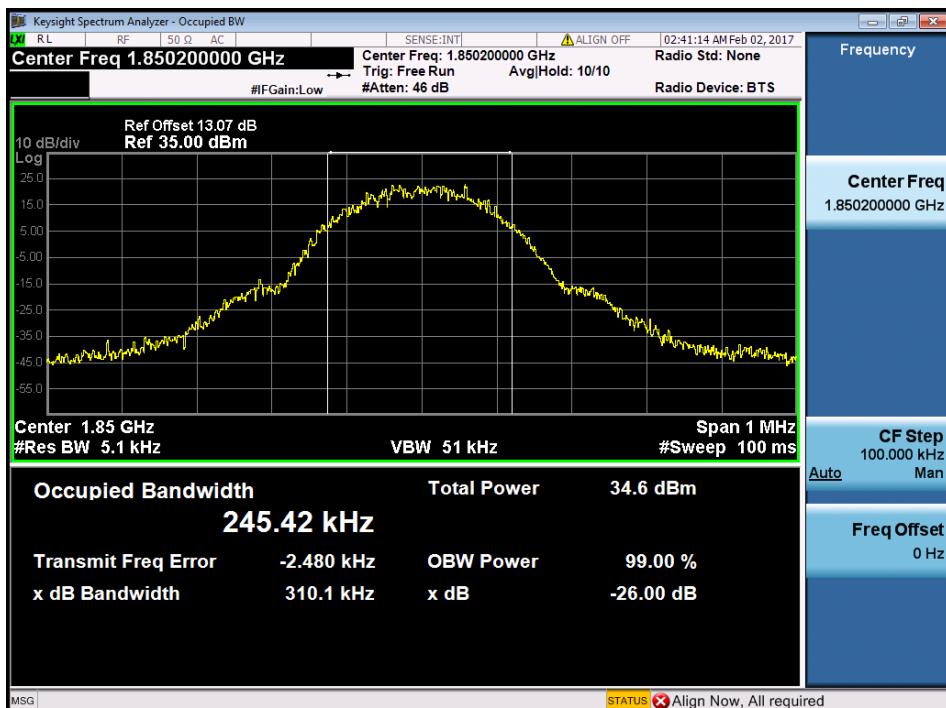
Band	GSM 1900MHz	Test Mode	GSM/TM1	Channel	Mid
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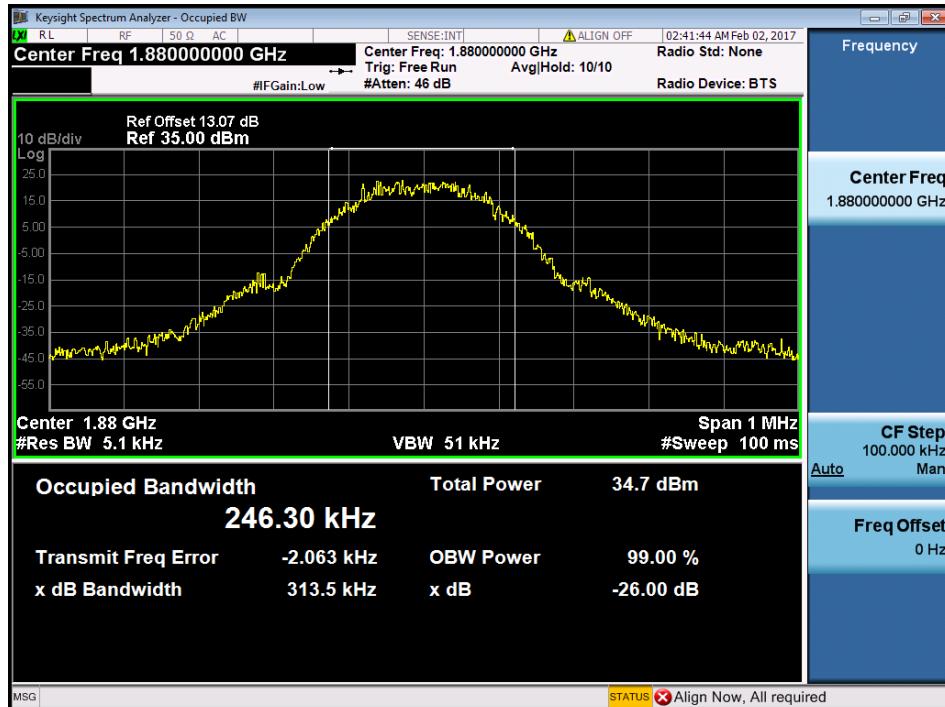
Band	GSM 1900MHz	Test Mode	GSM/TM1	Channel	High
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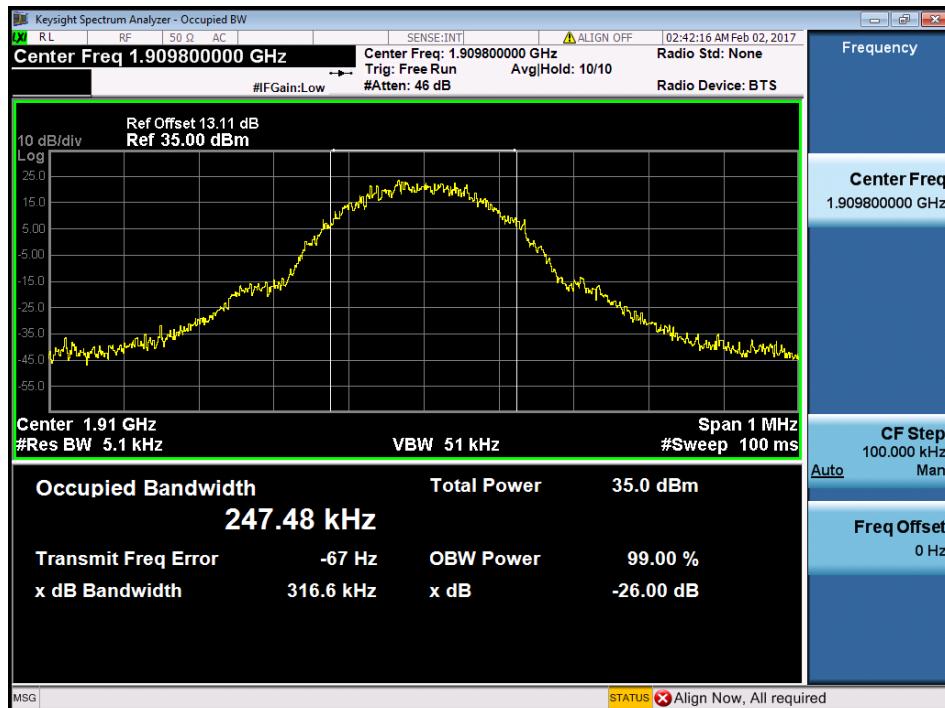
Band	GSM 1900MHz	Test Mode	GSM/TM2	Channel	Low
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Band	GSM 1900MHz	Test Mode	GSM/TM2	Channel	Mid
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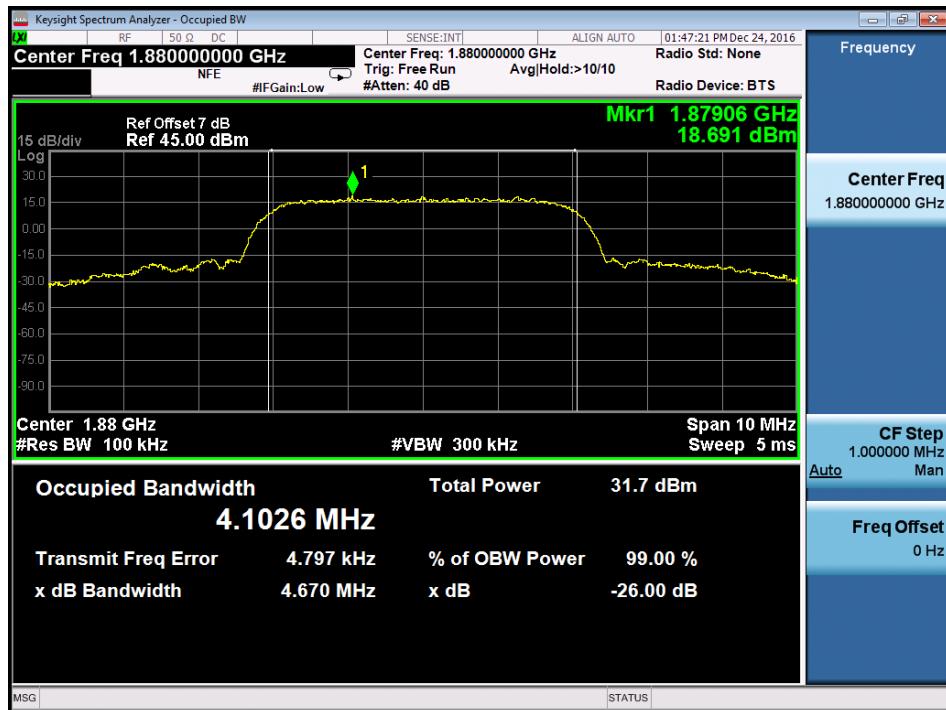
Band	GSM 1900MHz	Test Mode	GSM/TM2	Channel	High
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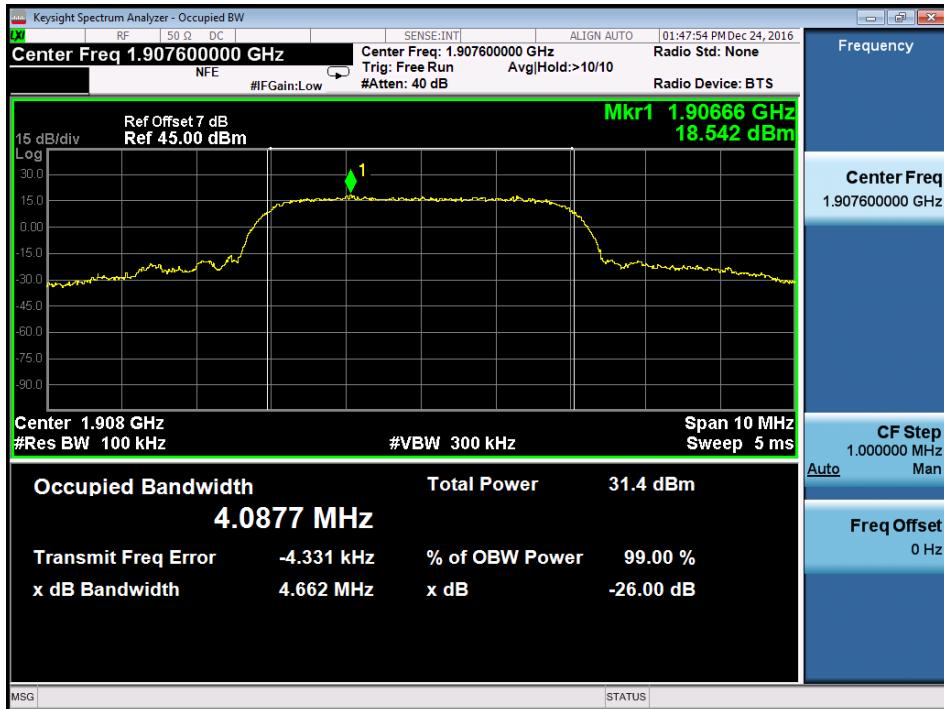
Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Low
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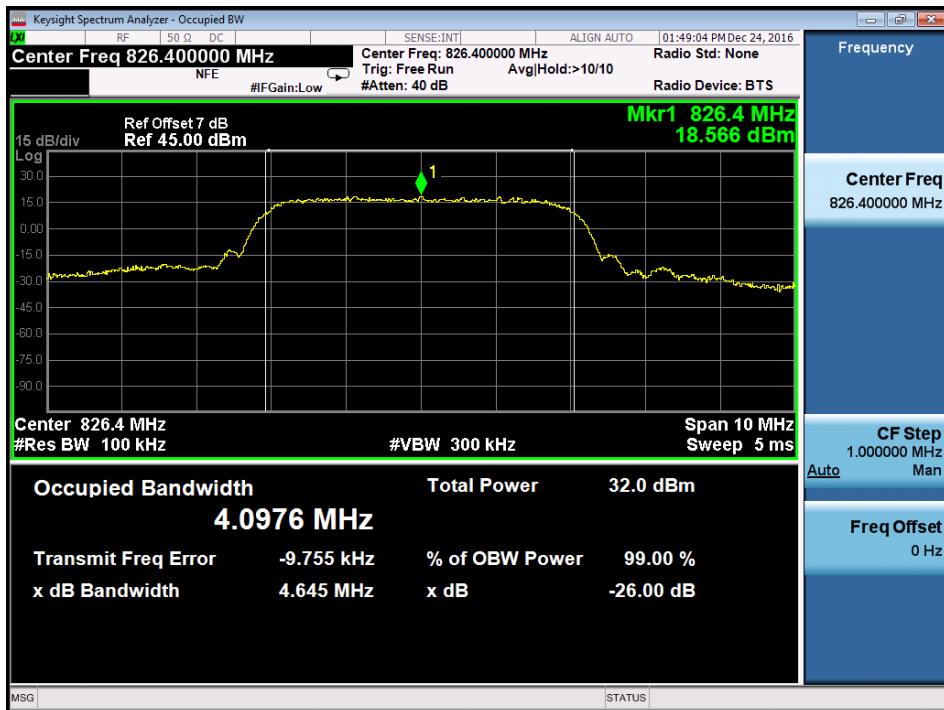
Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Mid
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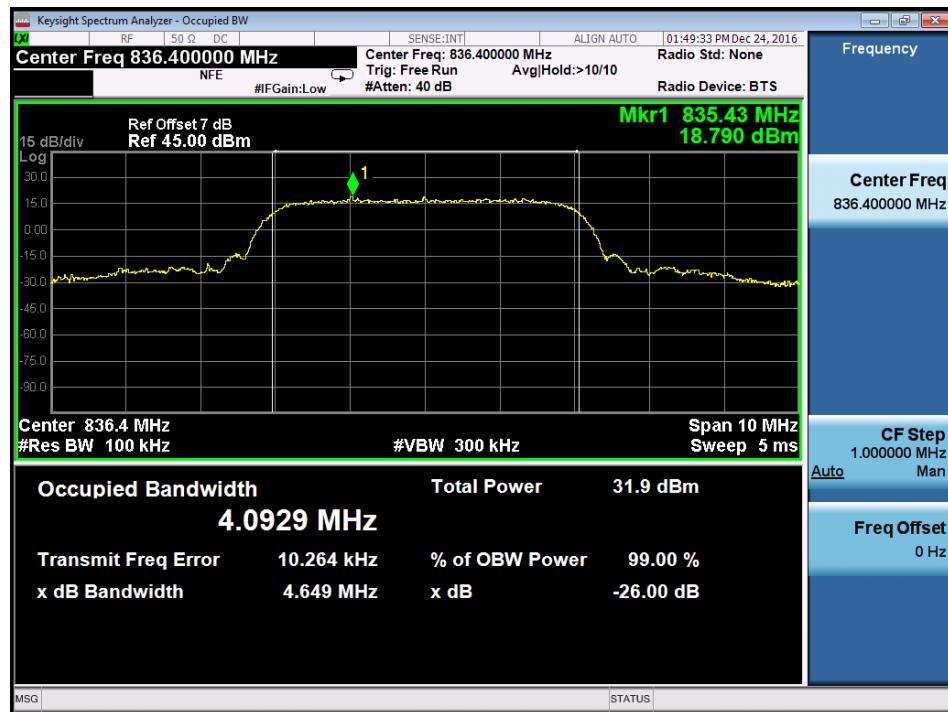
Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	High
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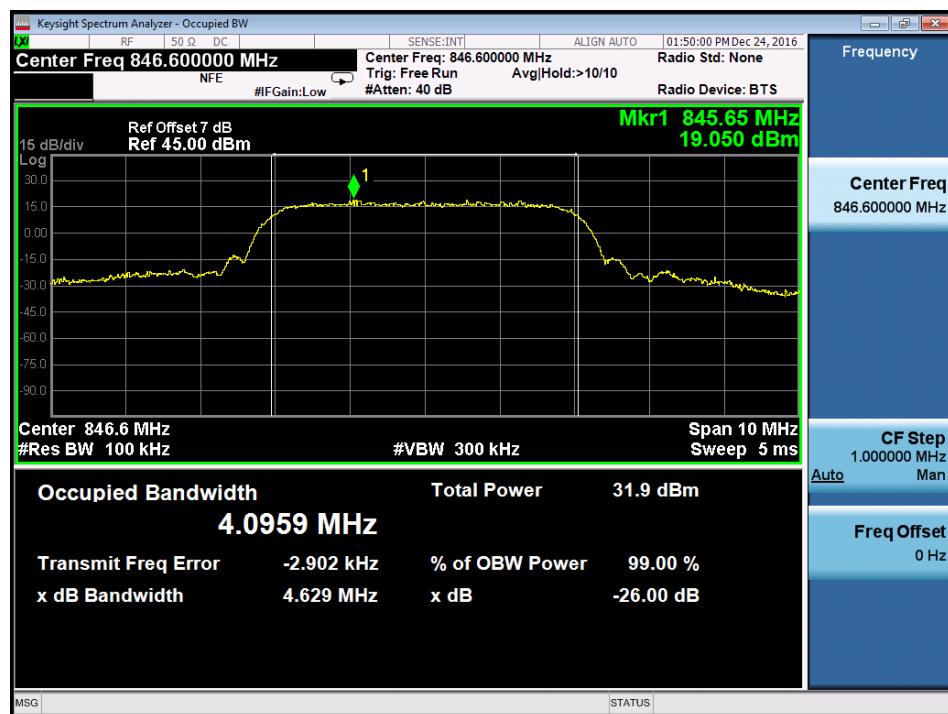
Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Low
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Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Mid
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Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	High
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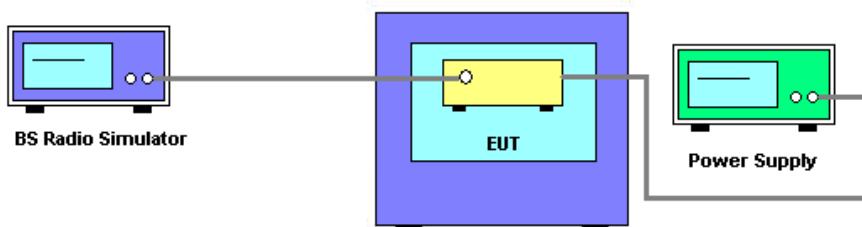
## 6.4 FREQUENCY STABILITY

### REQUIREMENT

According to FCC part 22.355 shall be tested the frequency stability. The rule is defined that “The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.” The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5 ppm of the received frequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) – 30°C ~ 50°C.

According to FCC part 24.235 shall be tested the frequency stability. The rule is defined that “The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.” The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 0.1 ppm of the received frequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) – 30°C ~ 50°C.

### TEST SETUP



### **TEST PROCEDURES**

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. The nominal, highest and lowest extreme voltages were tested, which are specified by the applicant; the normal temperature here used is 25°C.
5. The variation in frequency was measured for the worst case.

### **TEST RESULT**

Test Result of GSM 850MHz Test Verdict:

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
GSM/TM1	VN	-30	34	0.02	2.5
		-20	20	0.01	
		-10	54	0.03	
		0	38	0.02	
		+10	16	0.01	
		+20	58	0.03	
		+30	24	0.01	
		+40	18	0.01	
		+55	49	0.03	
	VL	+25	35	0.02	
	VH	+25	22	0.01	

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
GSM/TM2	VN	-30	34	0.02	2.5
		-20	20	0.01	
		-10	54	0.03	
		0	38	0.02	
		+10	16	0.01	
		+20	58	0.03	
		+30	24	0.01	
		+40	18	0.01	
		+55	49	0.03	
	VL	+25	35	0.02	
	VH	+25	22	0.01	

Test Result of GSM 1900MHz Test Verdict:

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
GSM/TM1	VN	-30	34	0.02	2.5
		-20	20	0.01	
		-10	54	0.03	
		0	38	0.02	
		+10	16	0.01	
		+20	58	0.03	
		+30	24	0.01	
		+40	18	0.01	
		+55	49	0.03	
	VL	+25	35	0.02	
	VH	+25	22	0.01	

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	Power (VDC)	Temperature (°C)	Hz	ppm	ppm
GSM/TM2	VN	-30	34	0.02	2.5
		-20	20	0.01	
		-10	54	0.03	
		0	38	0.02	
		+10	16	0.01	
		+20	58	0.03	
		+30	24	0.01	
		+40	18	0.01	
		+55	49	0.03	
	VL	+25	35	0.02	
	VH	+25	22	0.01	

Test Result of WCDMA Band II Test Verdict:

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	UMTS/TM1	Power (VDC)	Hz	ppm	ppm
			-30	34	0.02
			-20	20	0.01
			-10	54	0.03
			0	38	0.02
			+10	16	0.01
			+20	58	0.03
			+30	24	0.01
			+40	18	0.01
	VN	VL	+55	49	0.03
		VH	+25	35	0.02
		VH	+25	22	0.01

Test Result of WCDMA Band V Test Verdict:

Test Mode	Test Conditions		Frequency Deviation Middle Channel		
			Frequency Error	Frequency Error	Limit
	UMTS/TM1	Power (VDC)	Hz	ppm	ppm
			-30	34	0.02
			-20	20	0.01
			-10	54	0.03
			0	38	0.02
			+10	16	0.01
			+20	58	0.03
			+30	24	0.01
			+40	18	0.01
	VN	VL	+55	49	0.03
		VH	+25	35	0.02
		VH	+25	22	0.01

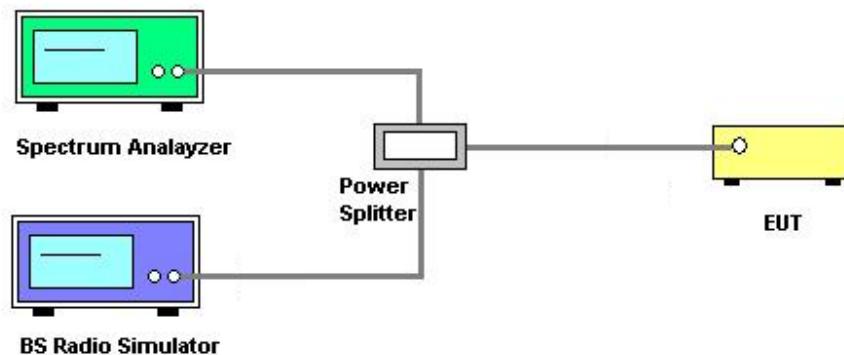
## 6.5 CONDUCTED OUT OF BAND EMISSIONS

### REQUIREMENT

According to FCC 22.917(a) specified that 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.

According to FCC 24.238(a) specified that 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 .

### TEST SETUP

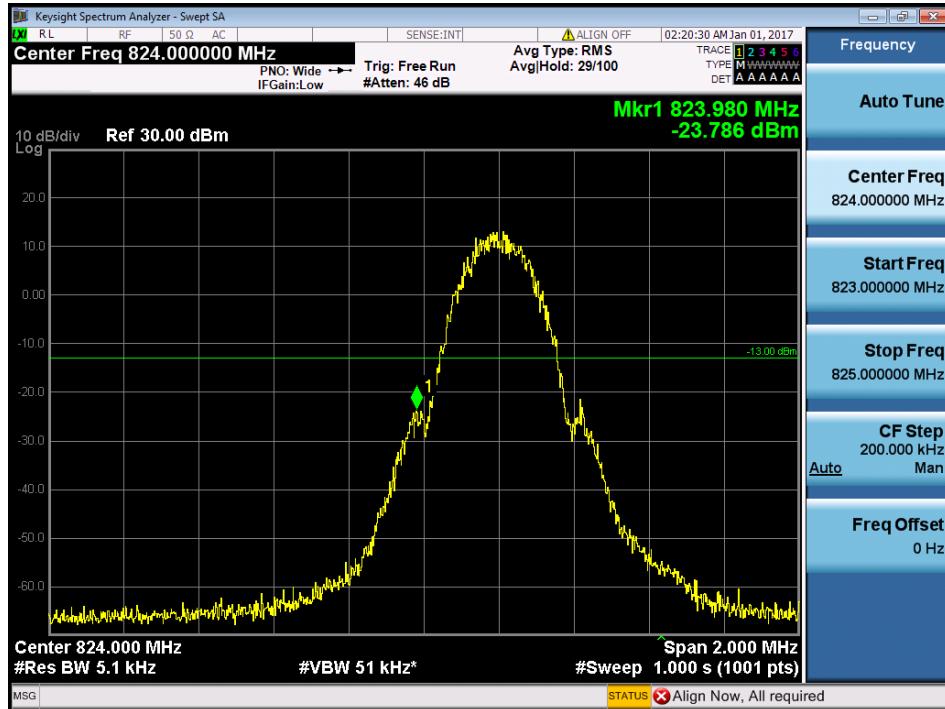


### **TEST PROCEDURES**

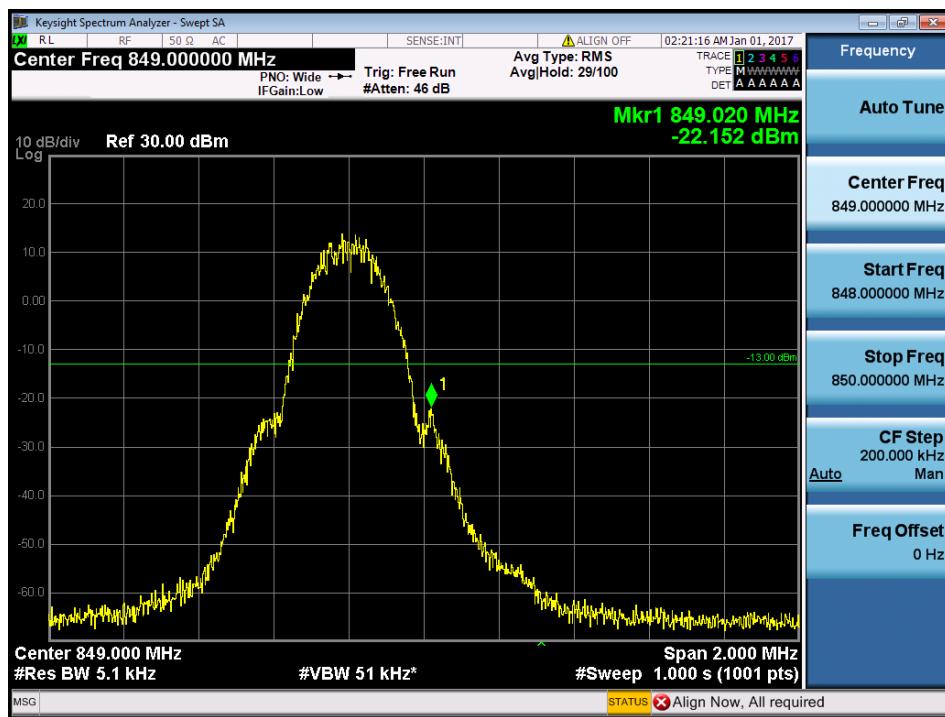
1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13 \text{ dBm}.$
8. For Band 7  
The limit line is derived from  $55 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [55 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$   
 $= -25 \text{ dBm}.$
9. For 9KHz to 30MHz: the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**TEST RESULT**

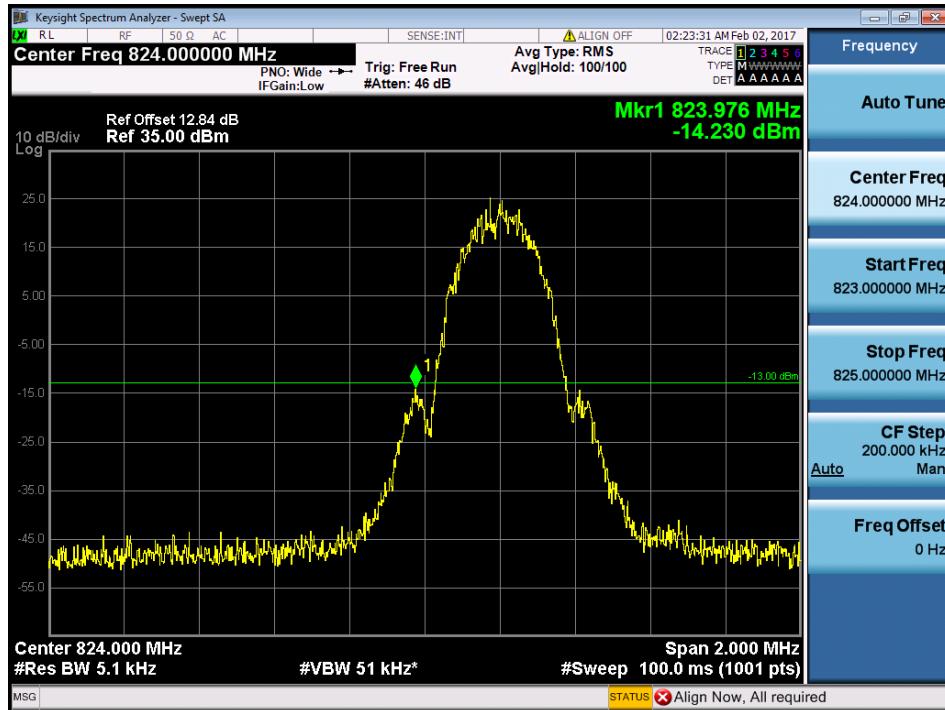
Band	GSM850MHz	Test Mode	GSM/TM1	Channel	Low
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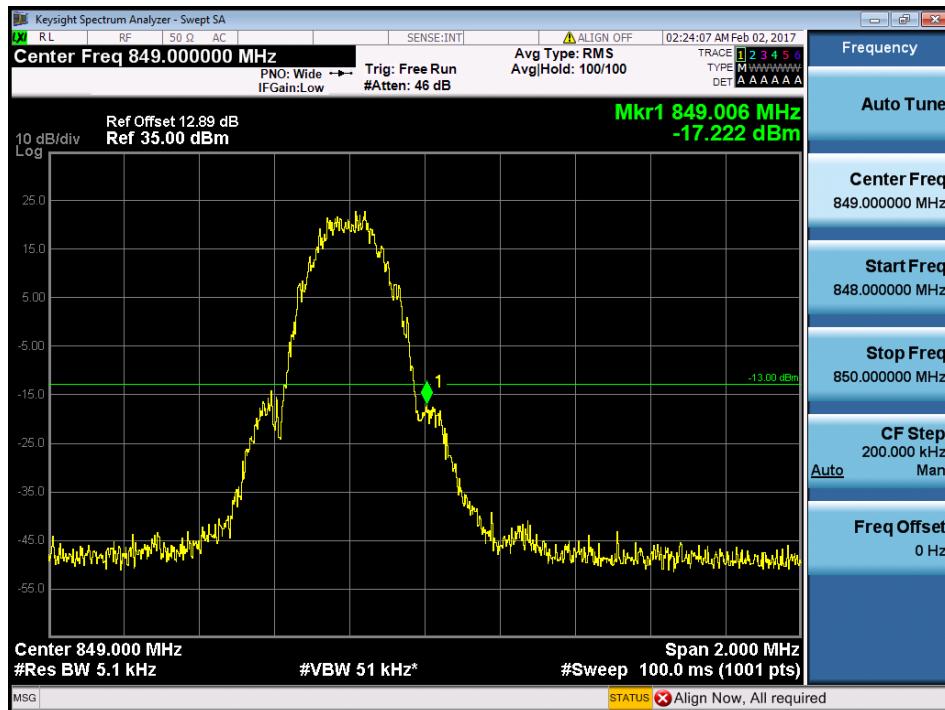
Band	GSM850MHz	Test Mode	GSM/TM1	Channel	High
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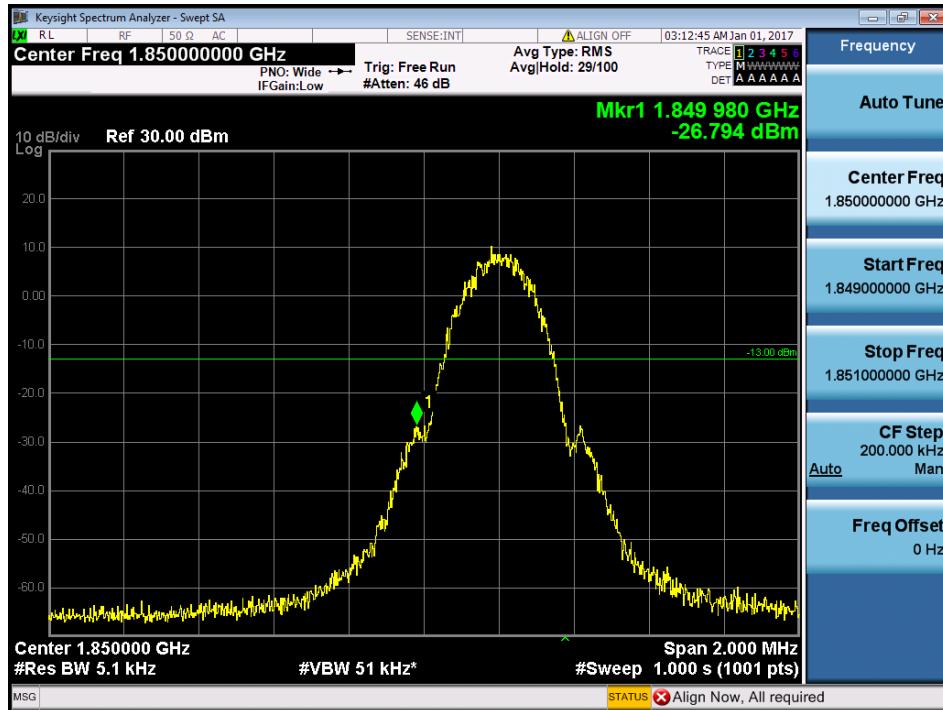
Band	GSM850MHz	Test Mode	GSM/TM2	Channel	Low
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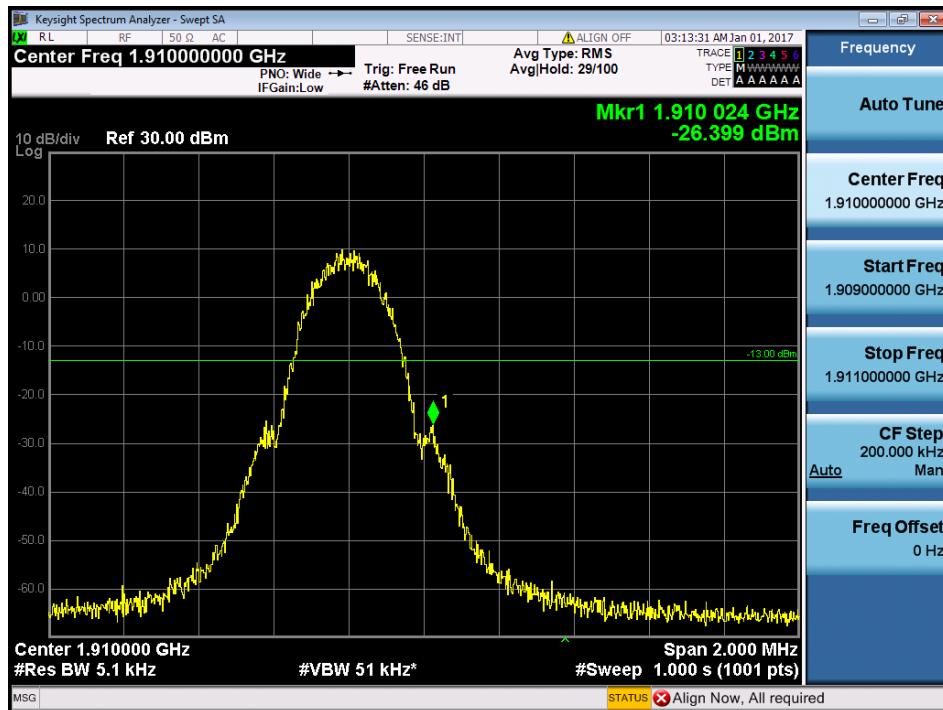
Band	GSM850MHz	Test Mode	GSM/TM2	Channel	High
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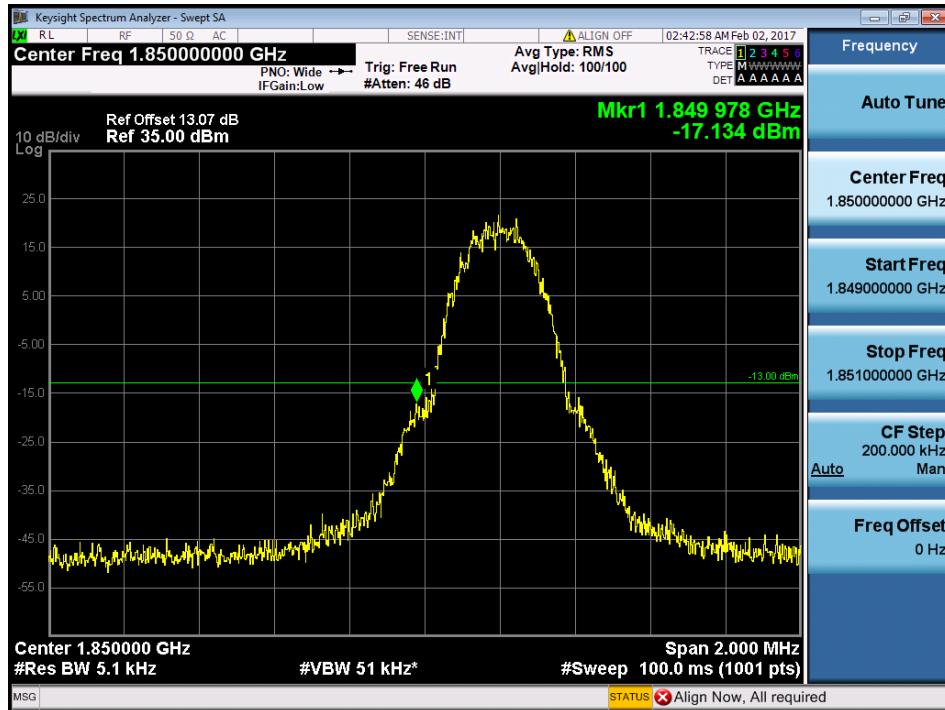
Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	Low
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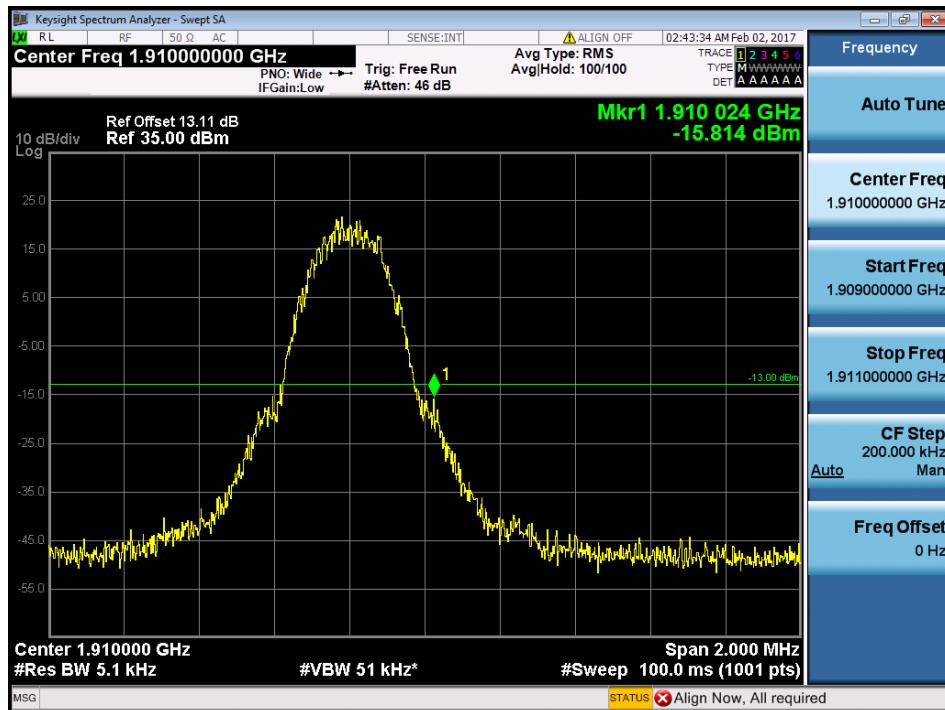
Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	High
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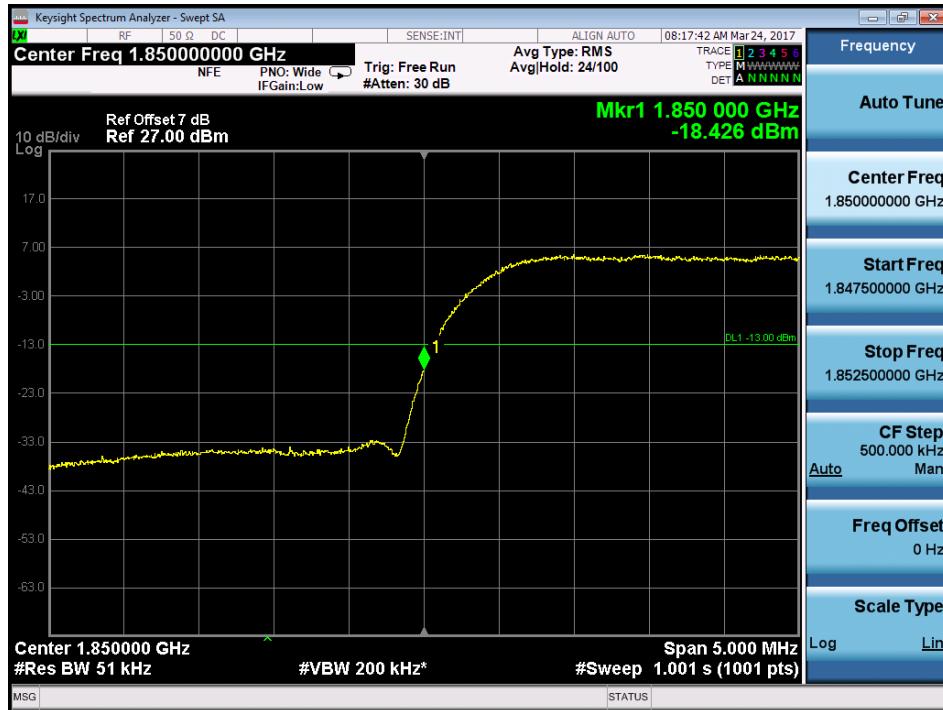
Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	Low
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Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	High
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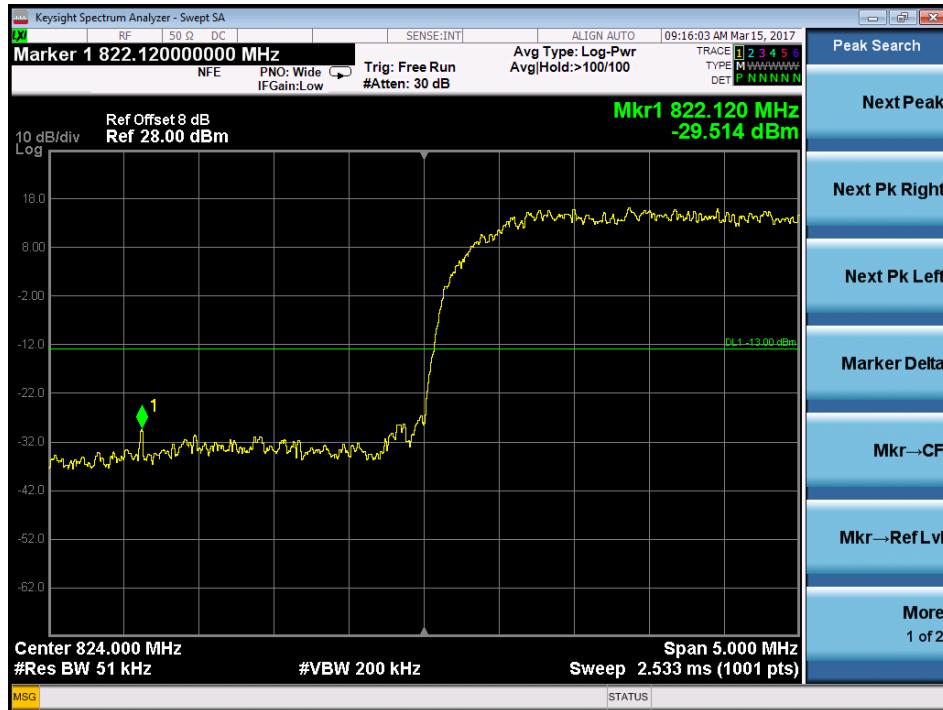
Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Low
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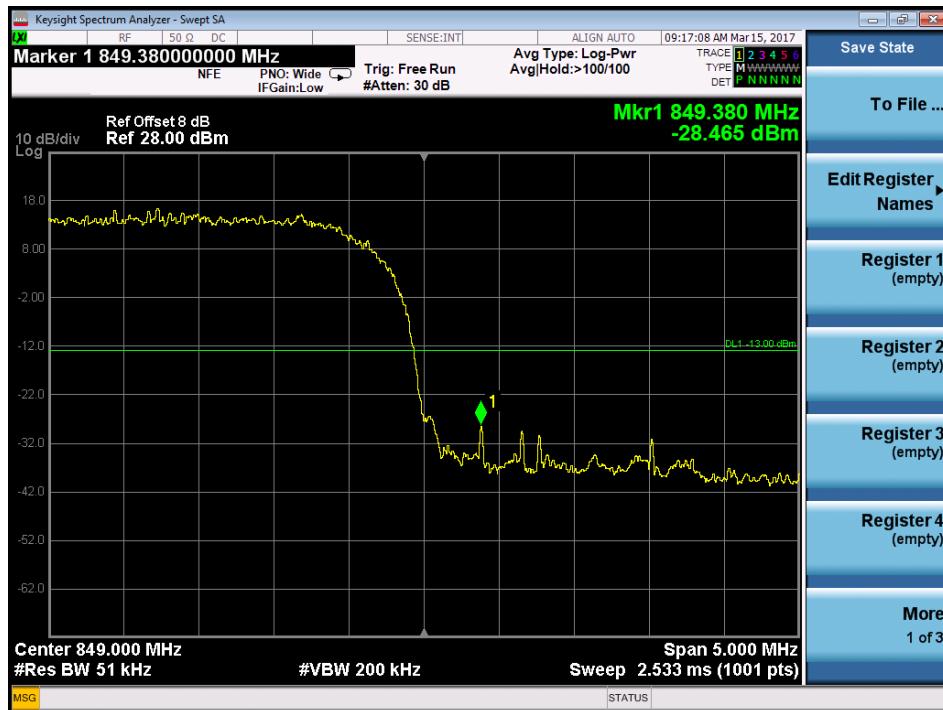
Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	High
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Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Low
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Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	High
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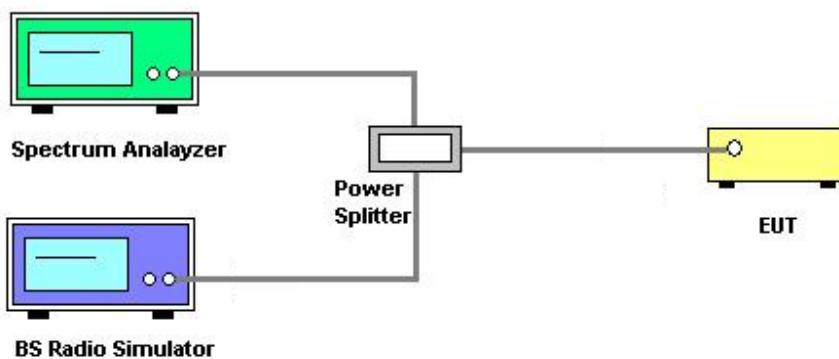
## 6.6 SPURIOUS EMISSION AT ANTENNA TERMINAL

### DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

According to FCC 22.917(a), on any frequency outside a licensee's frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The limit translates in the relevant power range (2 to 0.003W). At 2W(Power Control Level 5) the specified minimum attenuation becomes 43dB and the limit of emission equal to -13dBm.

According to FCC 24.238(a), on any frequency outside a licensee's frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The limit translates in the relevant power range (1 to 0.001W). At 1W(Power Control Level 0) the specified minimum attenuation becomes 43dB and the limit of emission equal to -13dBm.

### TEST SETUP



### **TEST PROCEDURES**

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set  $RBW \geq 1\% EBW$  in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(W) - [43 + 10\log(P)] \text{ (dB)} \\ &= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} \\ &= -13 \text{ dBm.} \end{aligned}$$

<For Band 7>

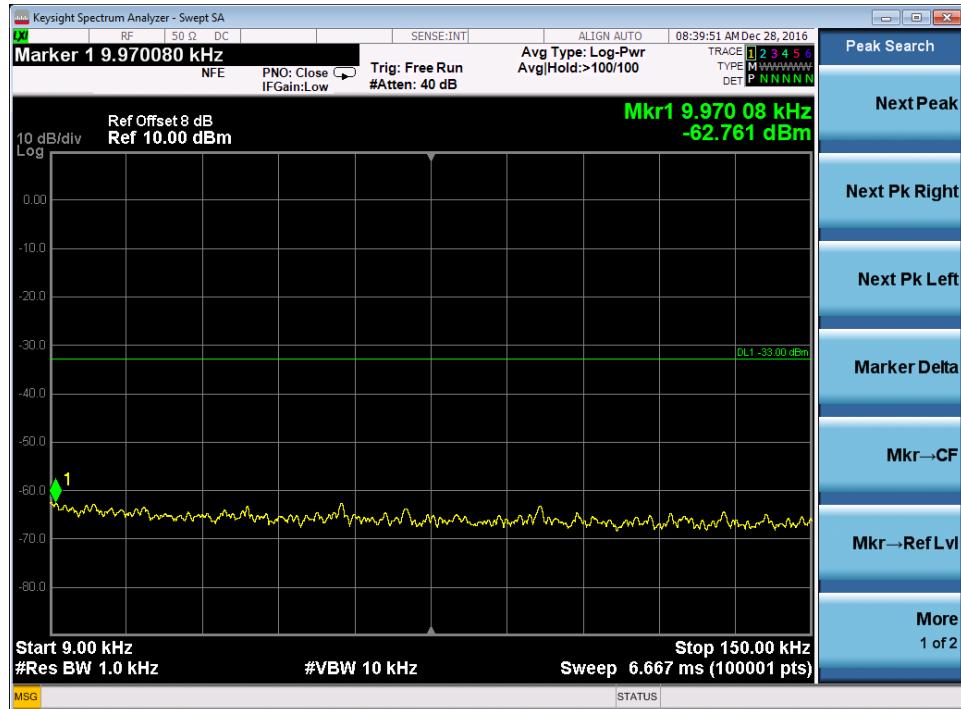
The limit line is derived from  $55 + 10\log(P)$  dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(W) - [55 + 10\log(P)] \text{ (dB)} \\ &= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)} \\ &= -25 \text{ dBm.} \end{aligned}$$

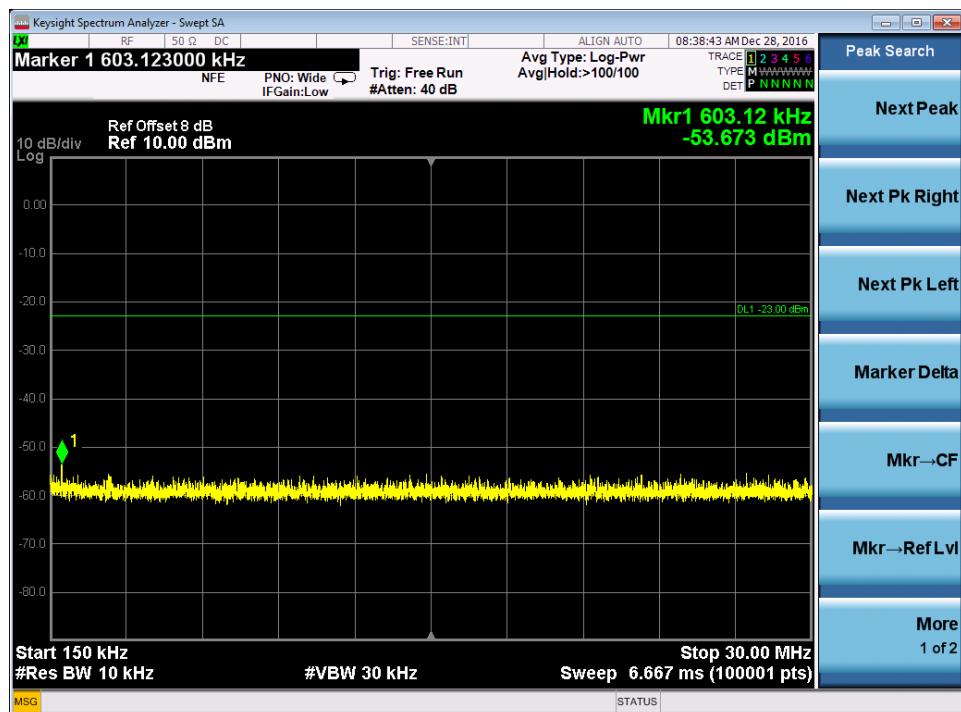
**TEST RESULT**

Band	GSM 850MHz	Test Mode	GSM/TM1	Channel	Low
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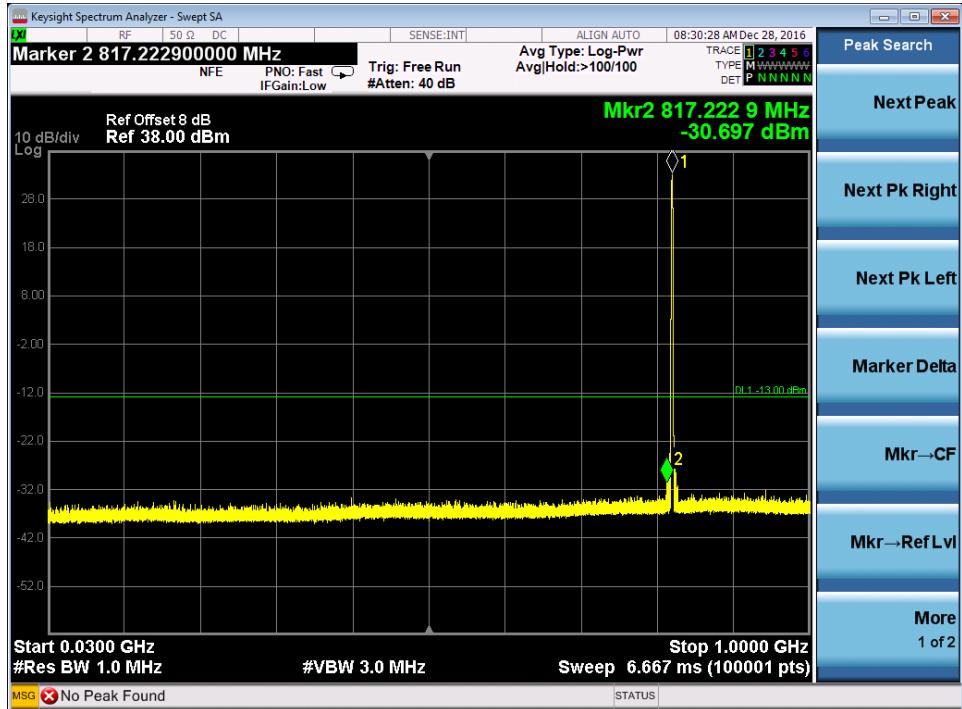
9KHz to 150KHz Test Plot



150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot



### 1GHz to 9GHz Test Plot

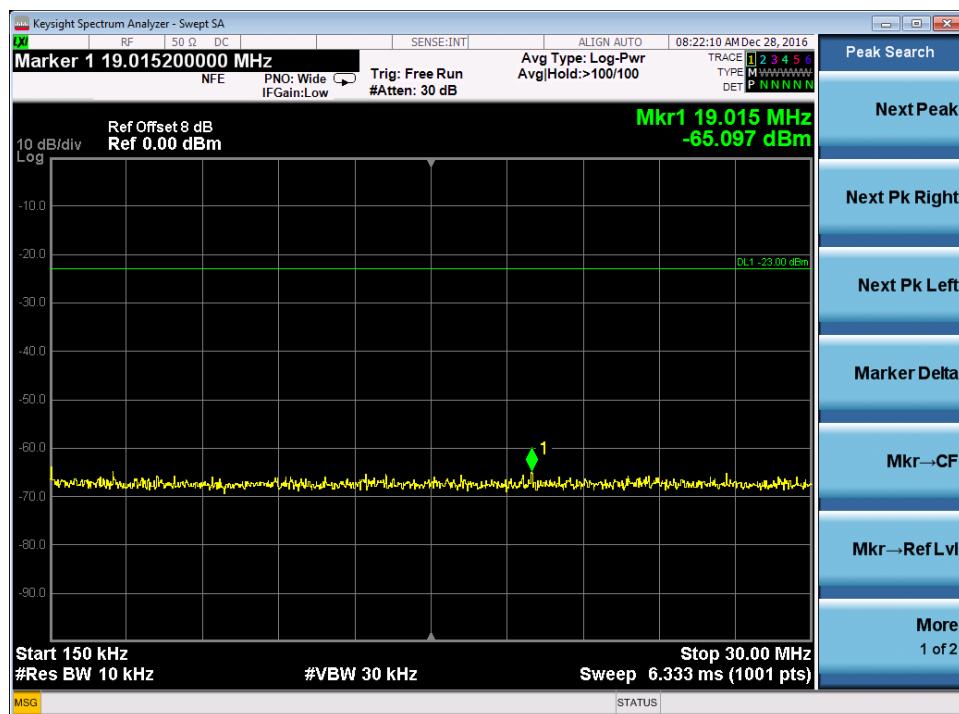


Band	GSM850MHz	Test Mode	GSM/TM1	Channel	Mid
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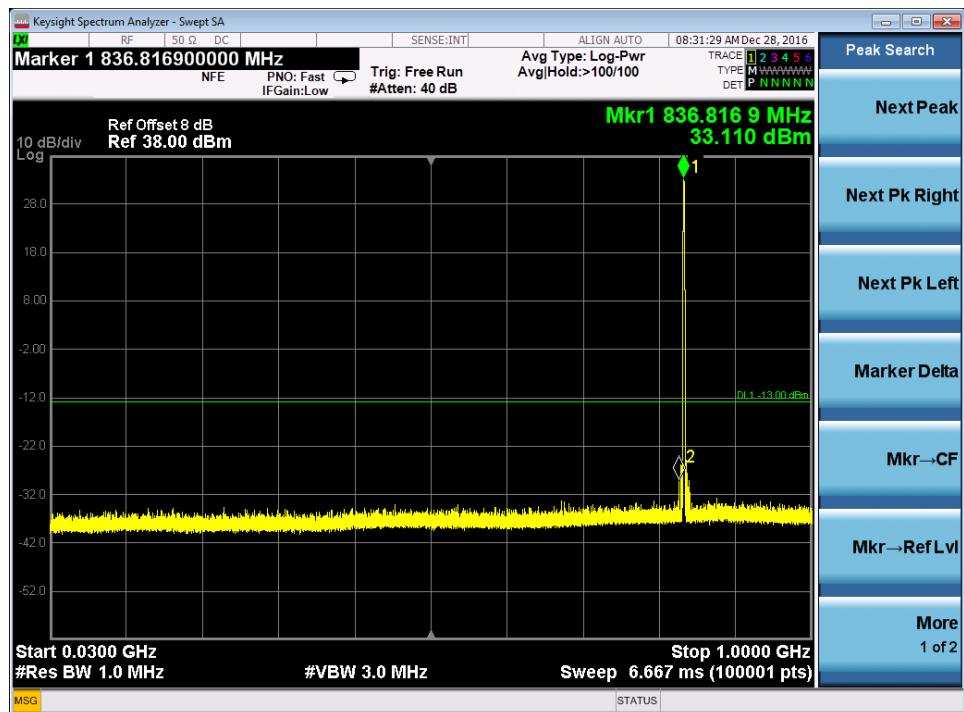
### 9KHz to 150KHz Test Plot



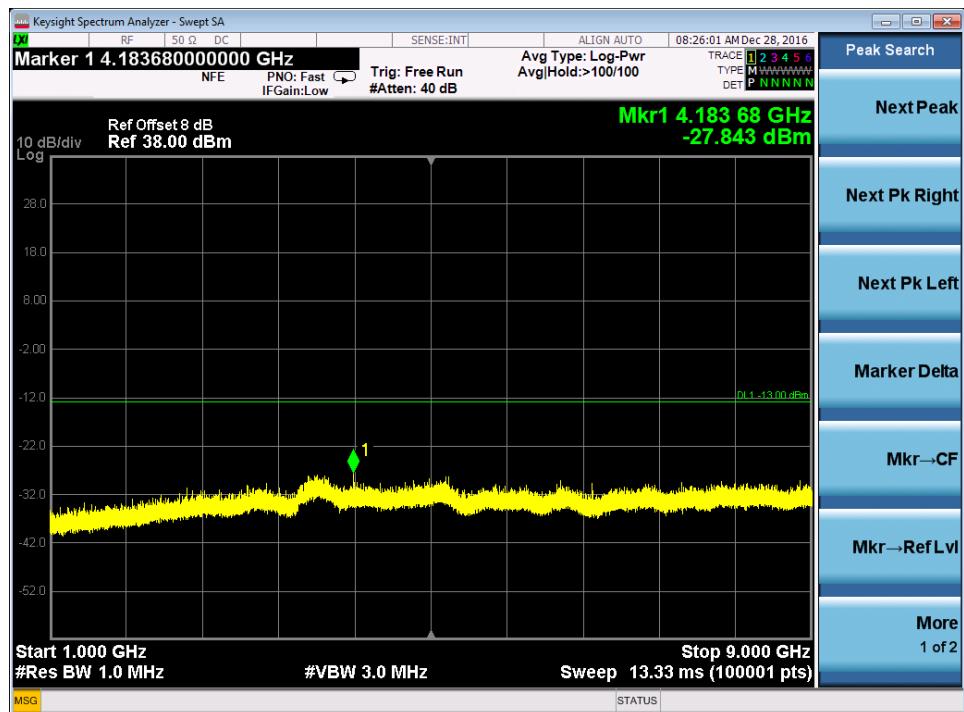
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

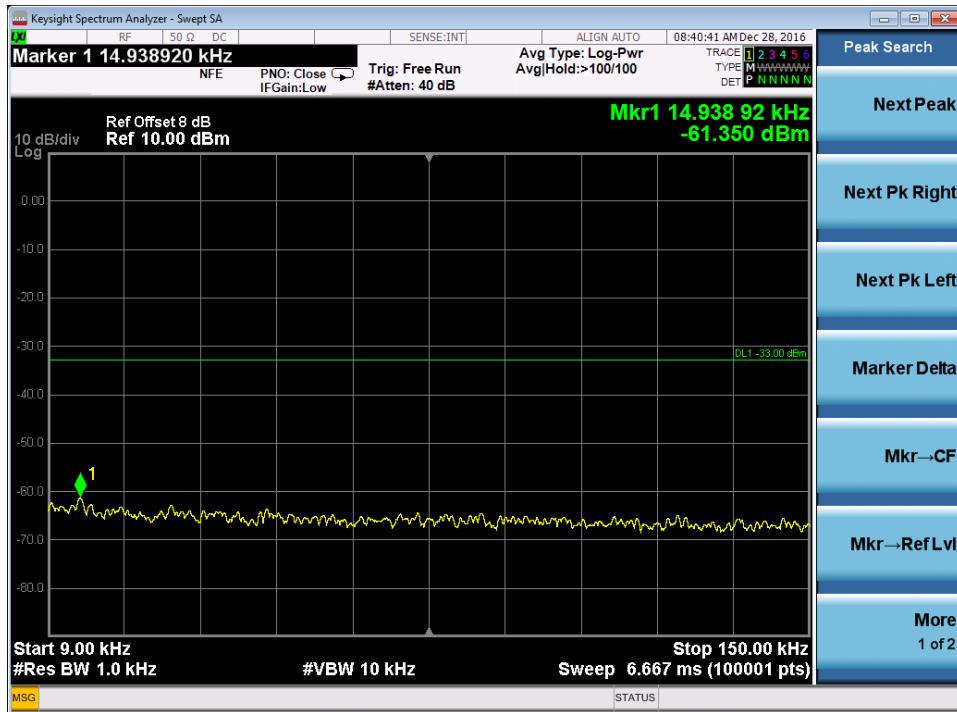


### 1GHz to 9GHz Test Plot

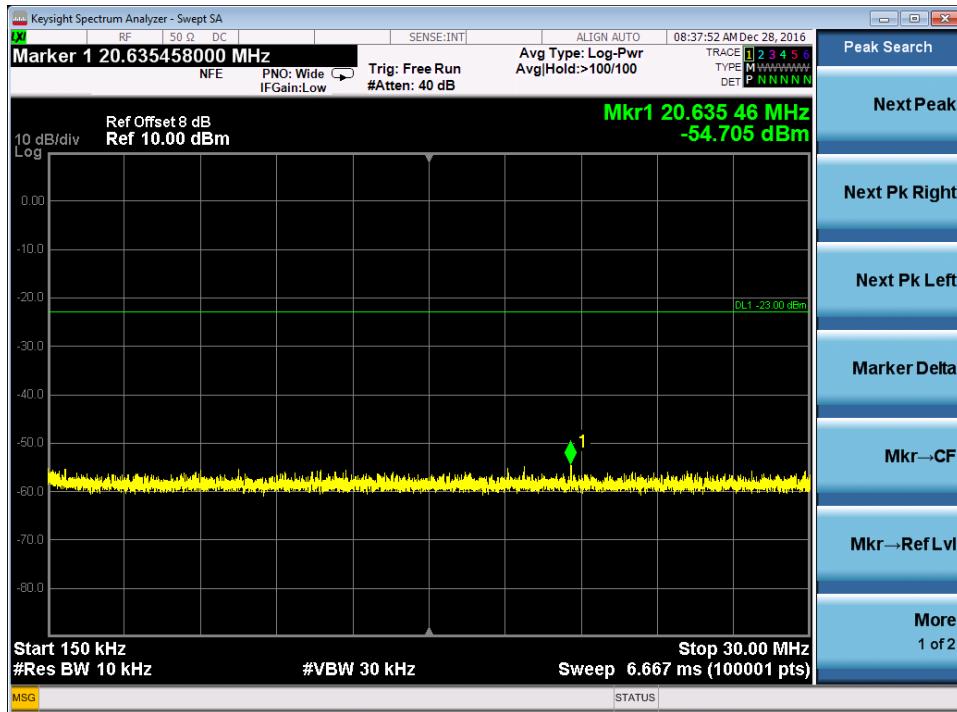


Band	GSM850MHz	Test Mode	GSM/TM1	Channel	High
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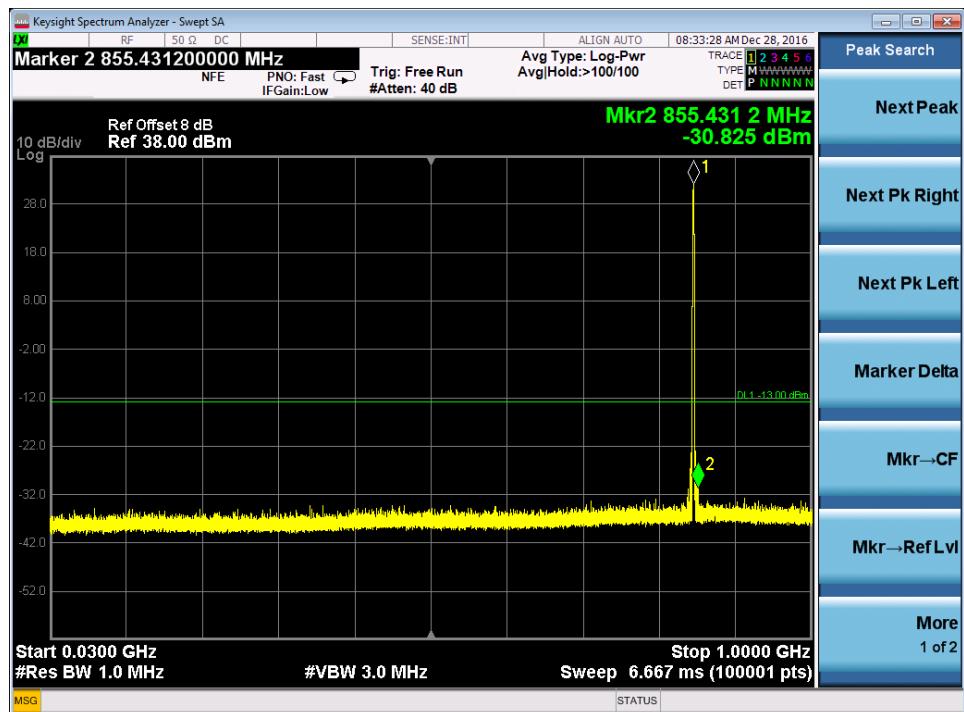
### 9KHz to 150KHz Test Plot



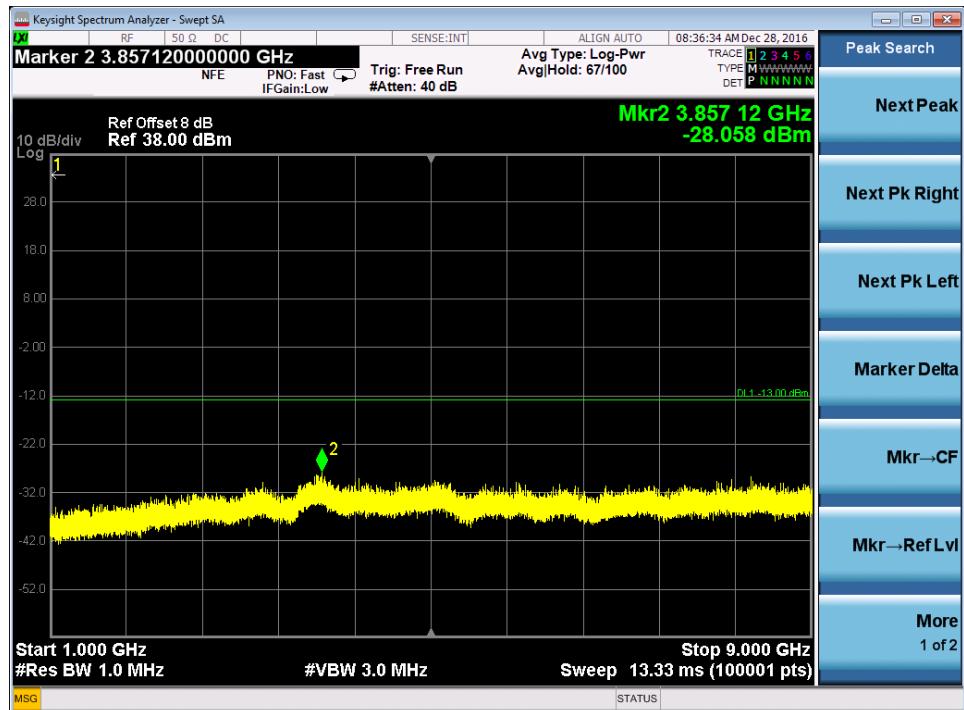
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

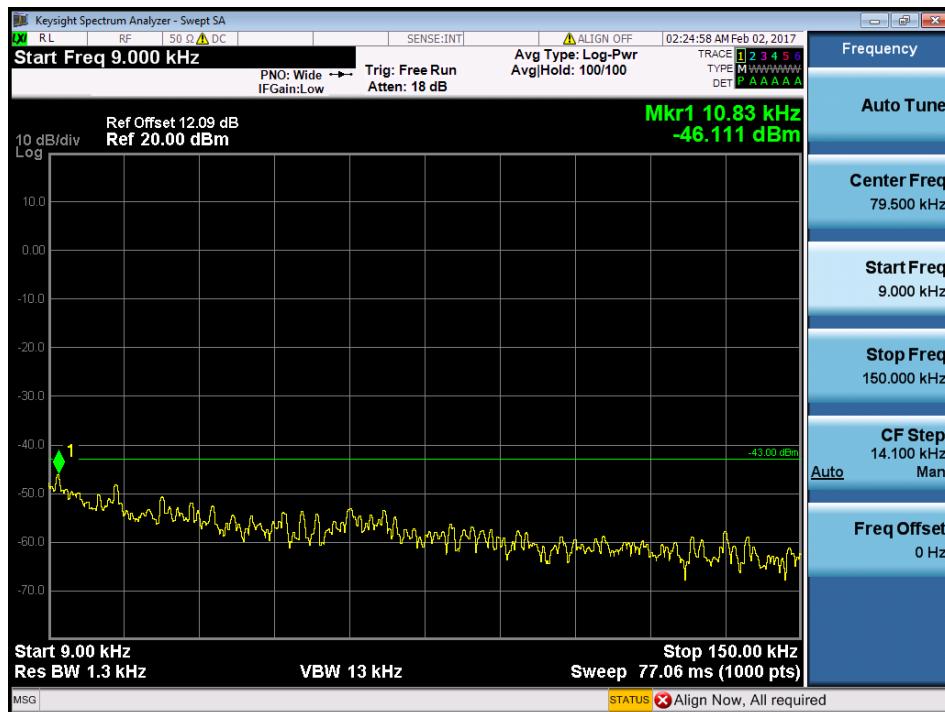


### 1GHz to 9GHz Test Plot

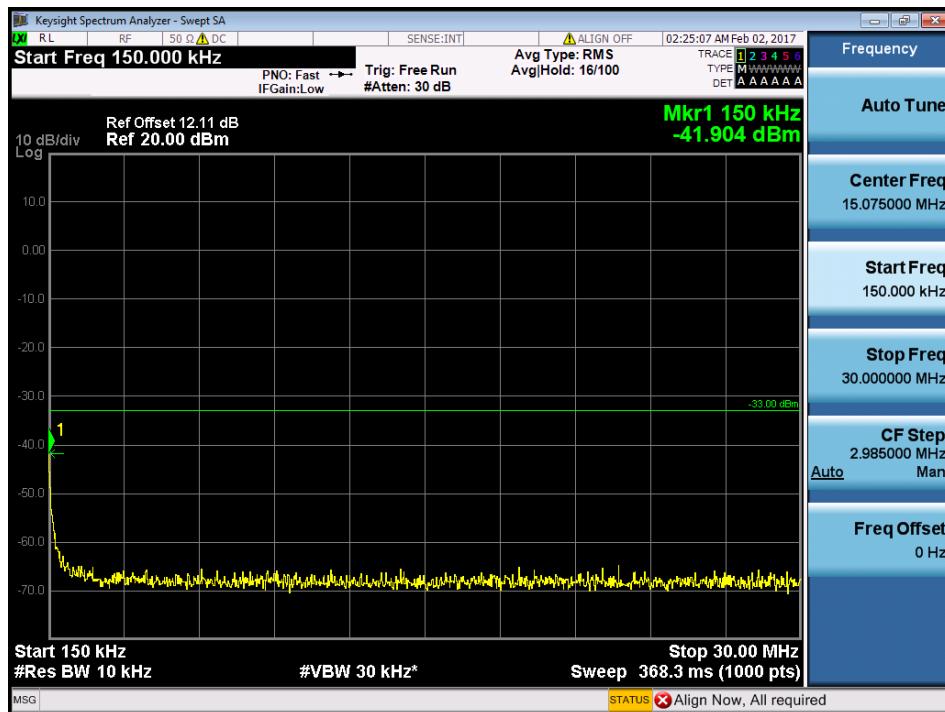


Band	GSM850MHz	Test Mode	GSM/TM2	Channel	Low
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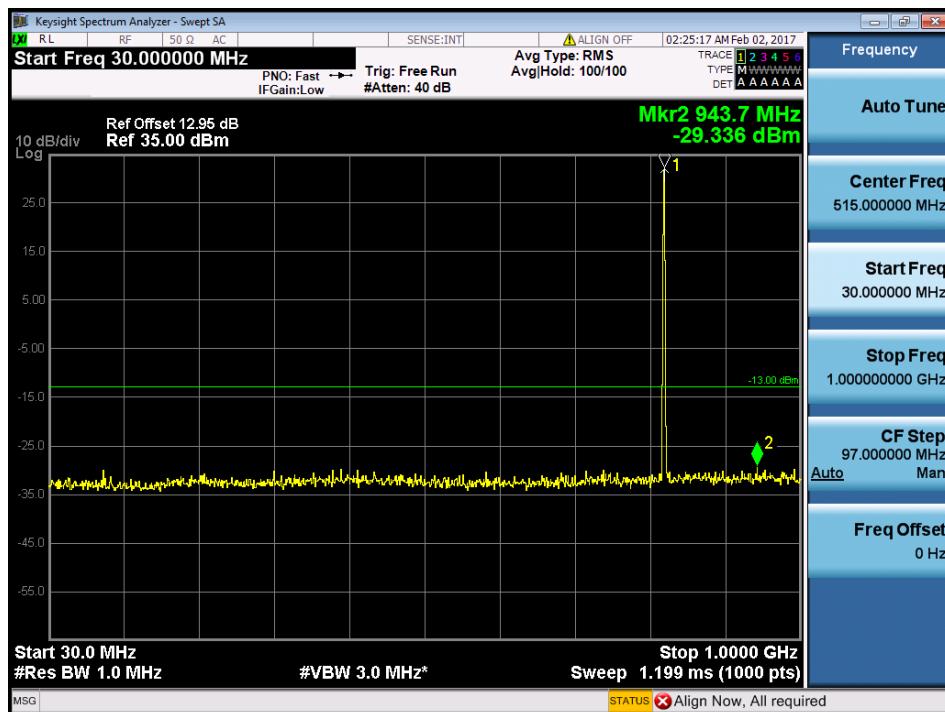
### 9KHz to 150KHz Test Plot



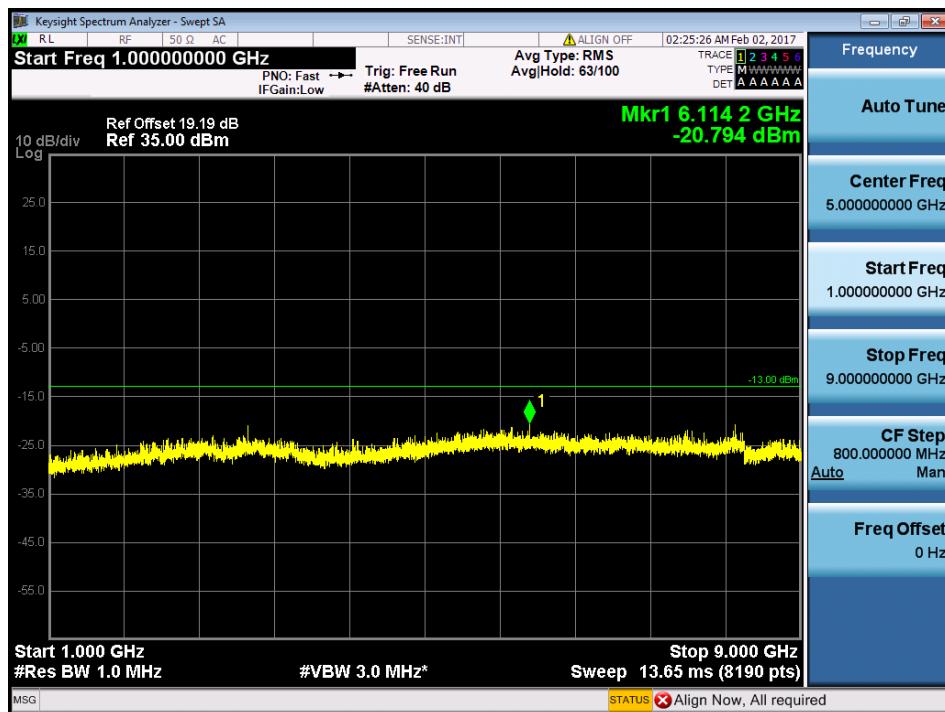
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

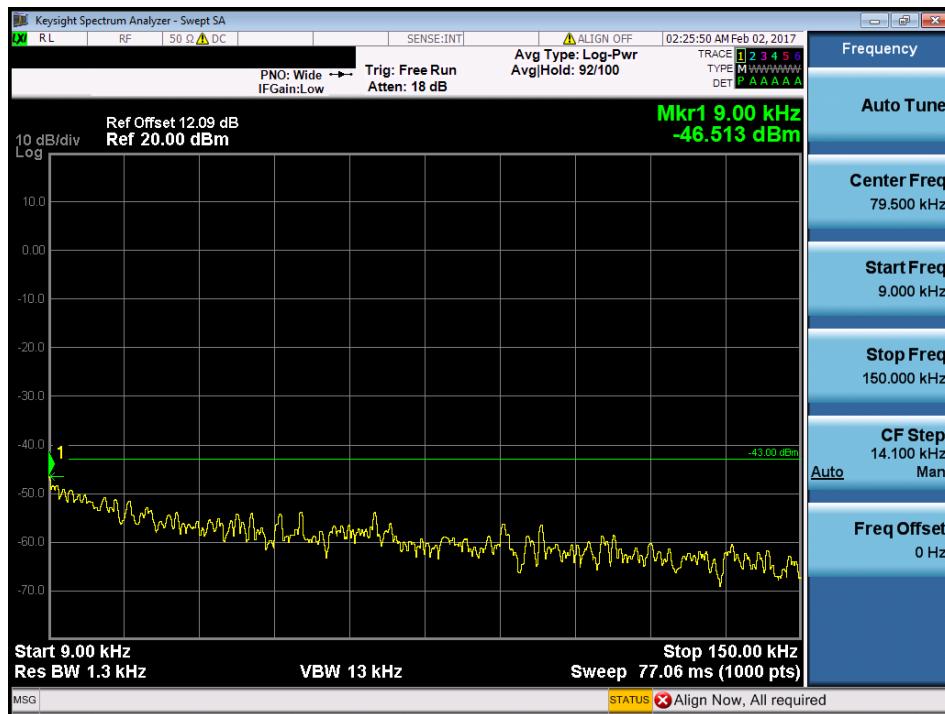


### 1GHz to 9GHz Test Plot

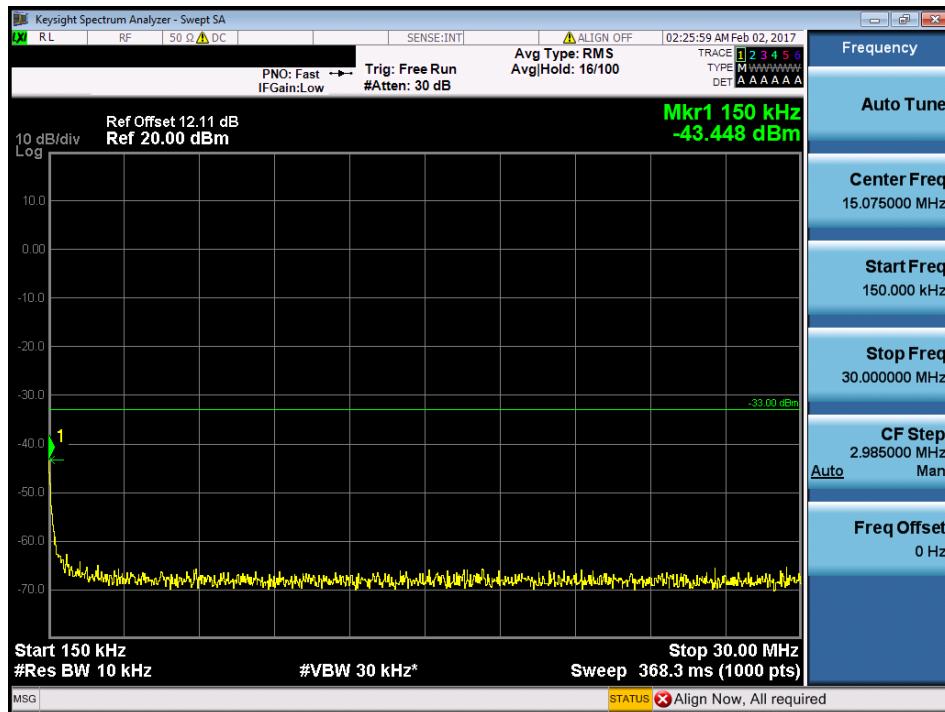


Band	GSM850MHz	Test Mode	GSM/TM2	Channel	Mid
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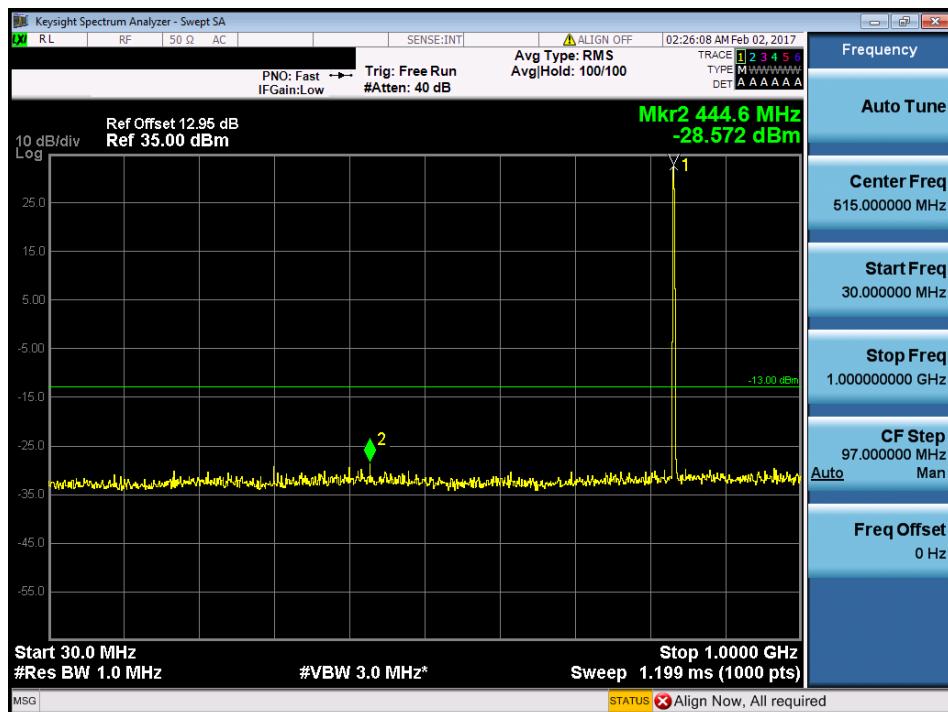
### 9KHz to 150KHz Test Plot



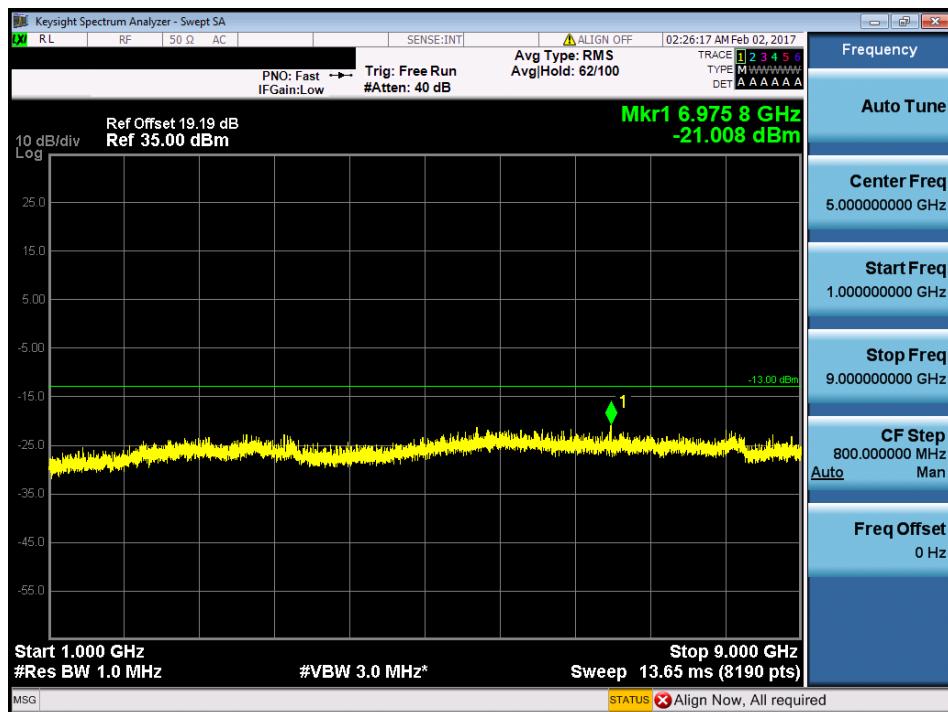
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

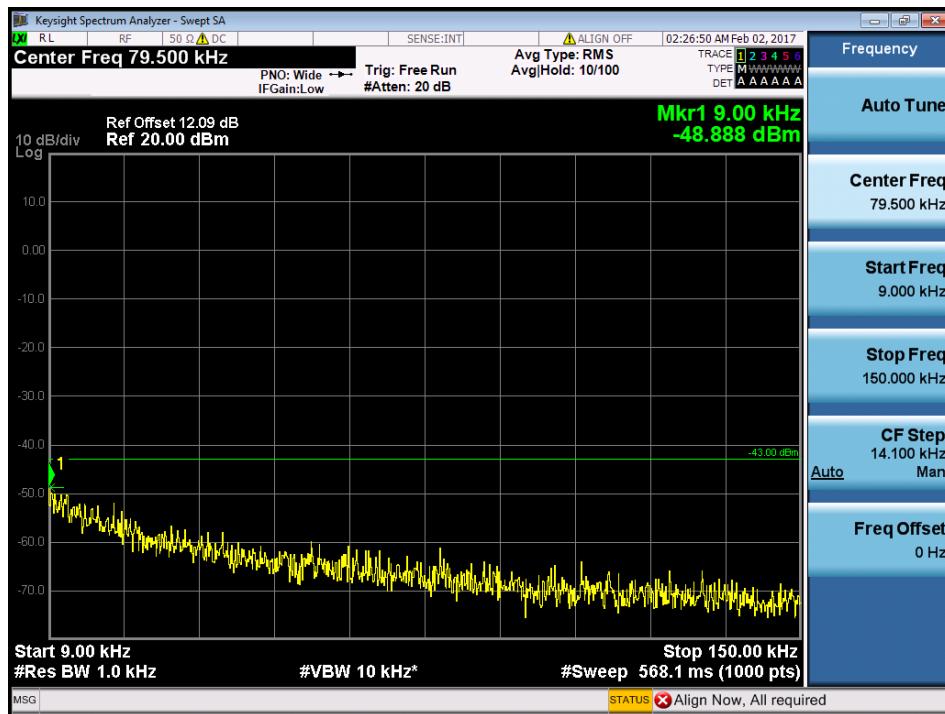


### 1GHz to 9GHz Test Plot

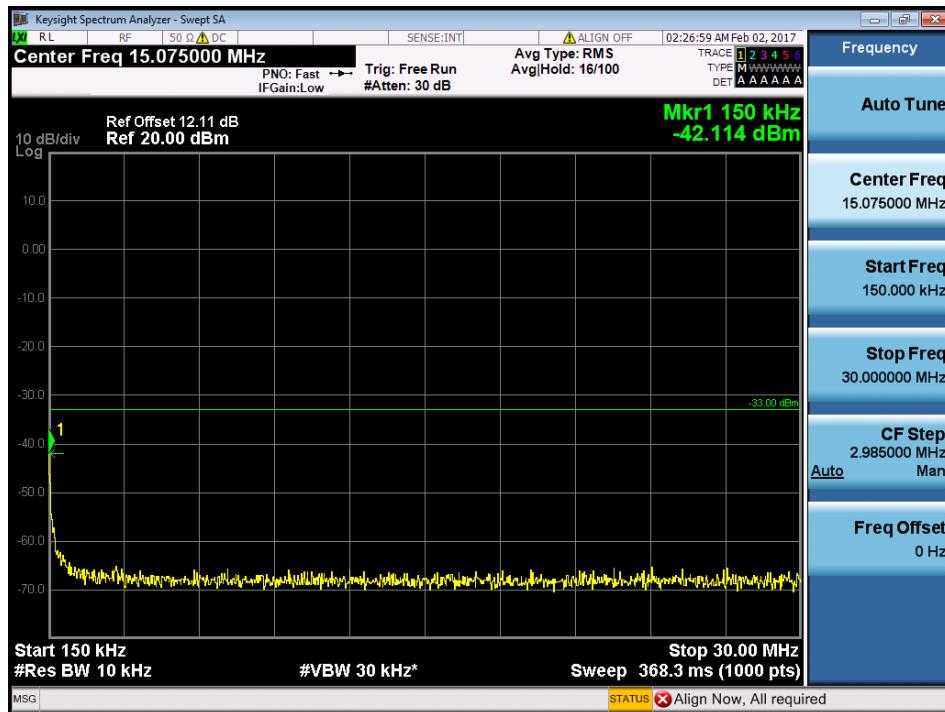


Band	GSM850MHz	Test Mode	GSM/TM2	Channel	High
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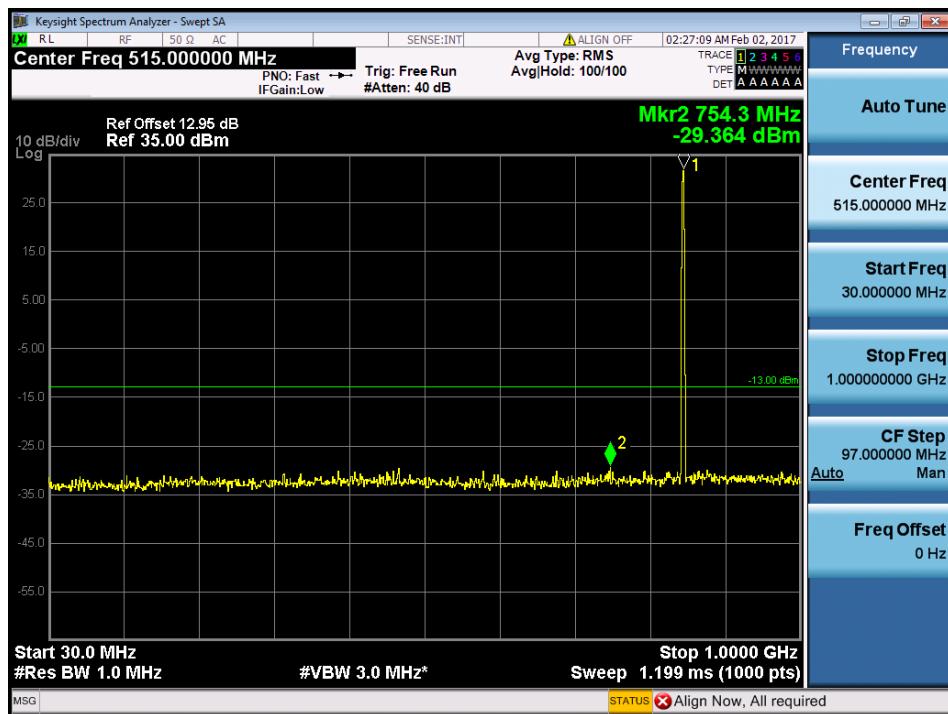
### 9KHz to 150KHz Test Plot



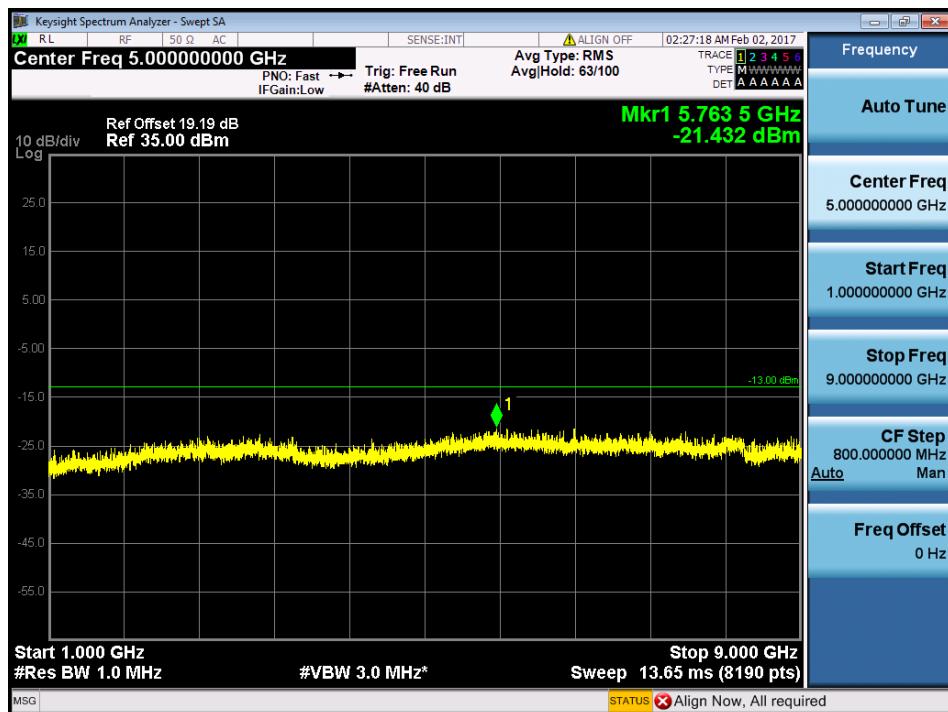
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

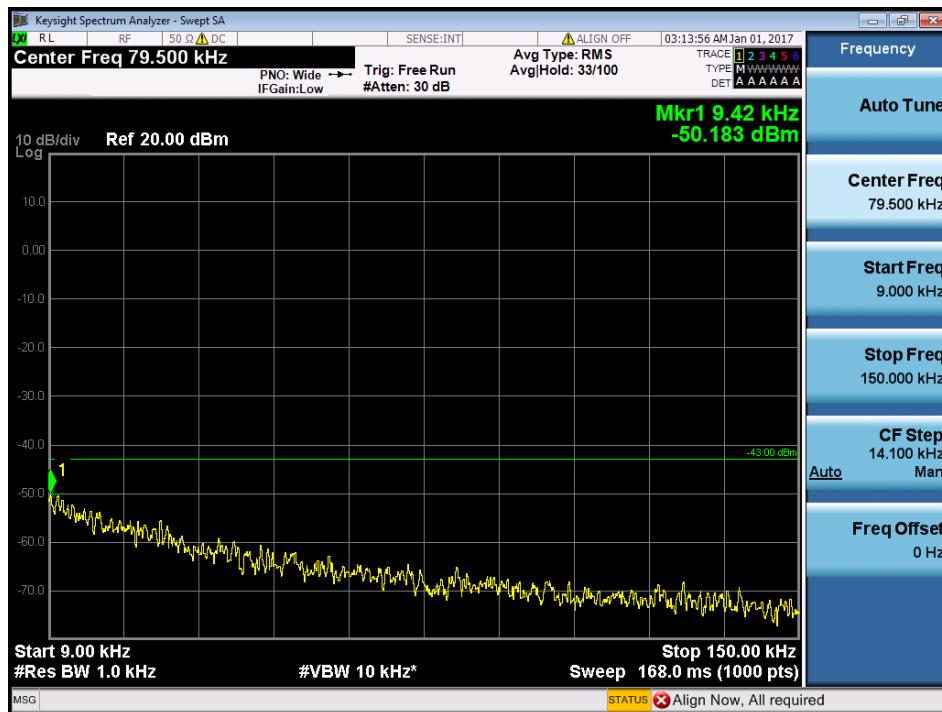


### 1GHz to 9GHz Test Plot



Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	Low
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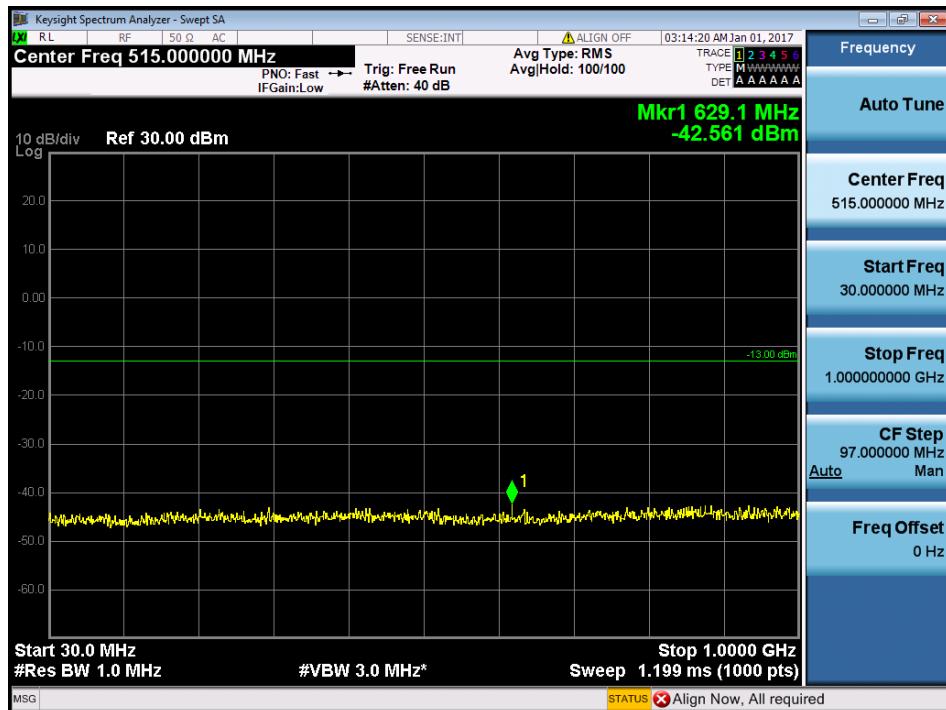
### 9KHz to 150KHz Test Plot



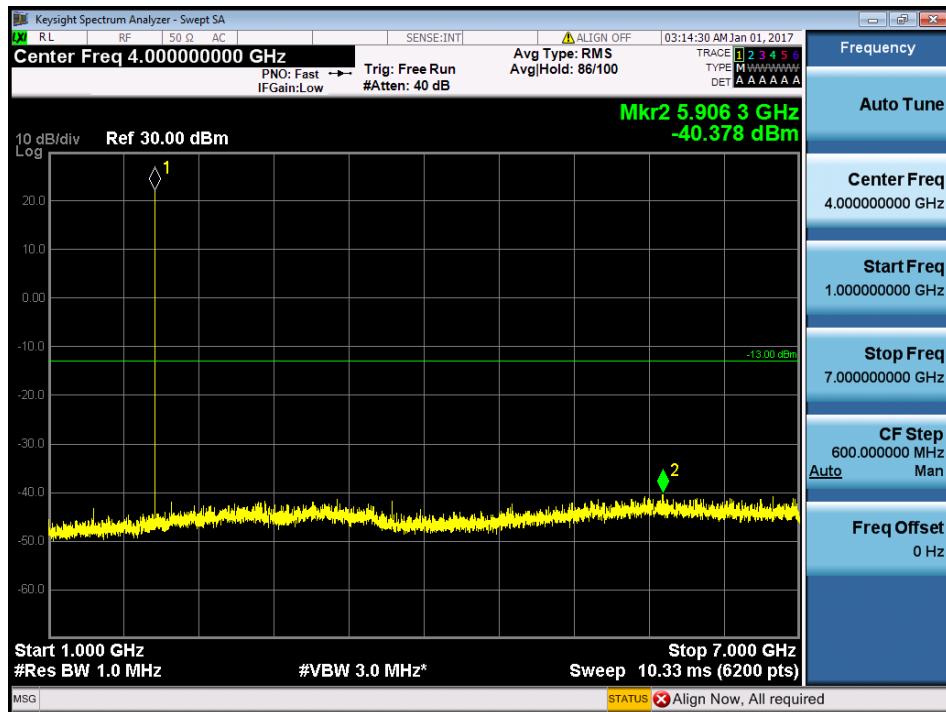
### 150KHz to 30MHz Test Plot



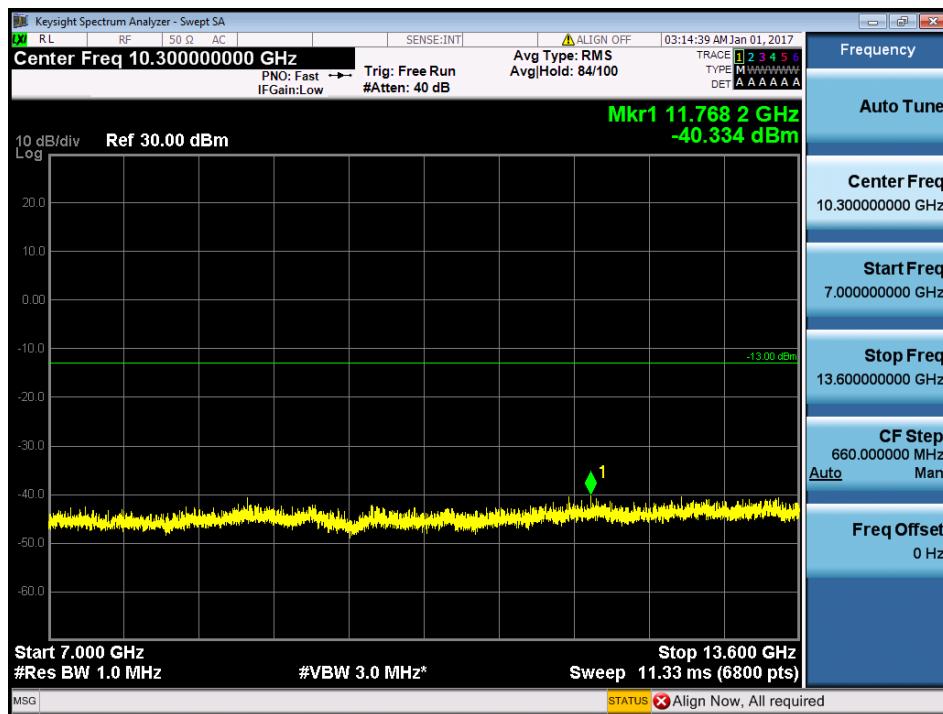
### 30MHz to 1GHz Test Plot



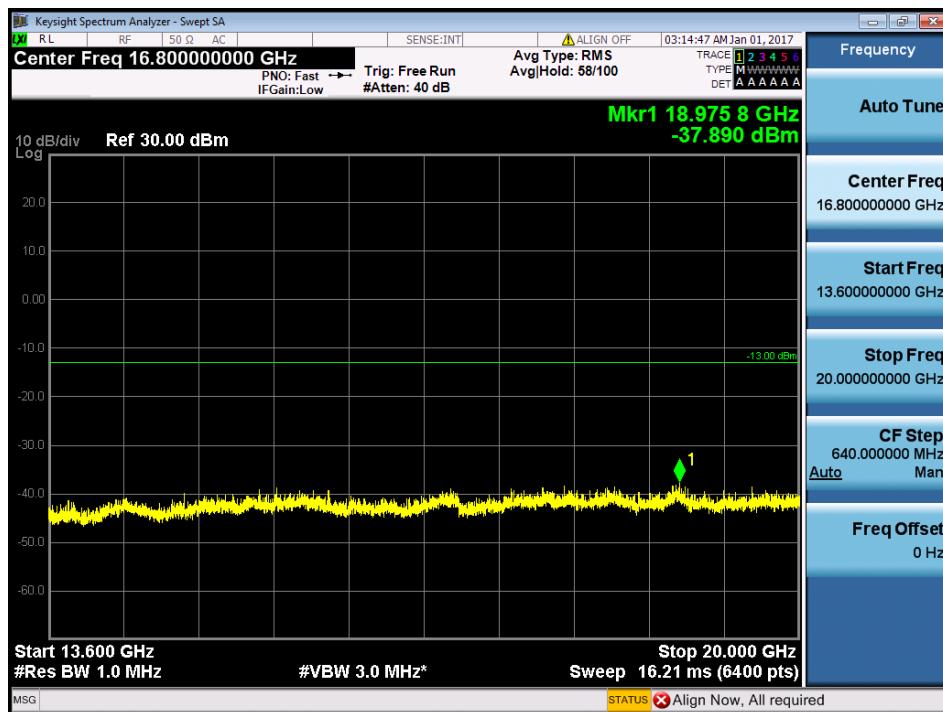
### 1GHz to 7GHz Test Plot



7GHz to 13.6GHz Test Plot

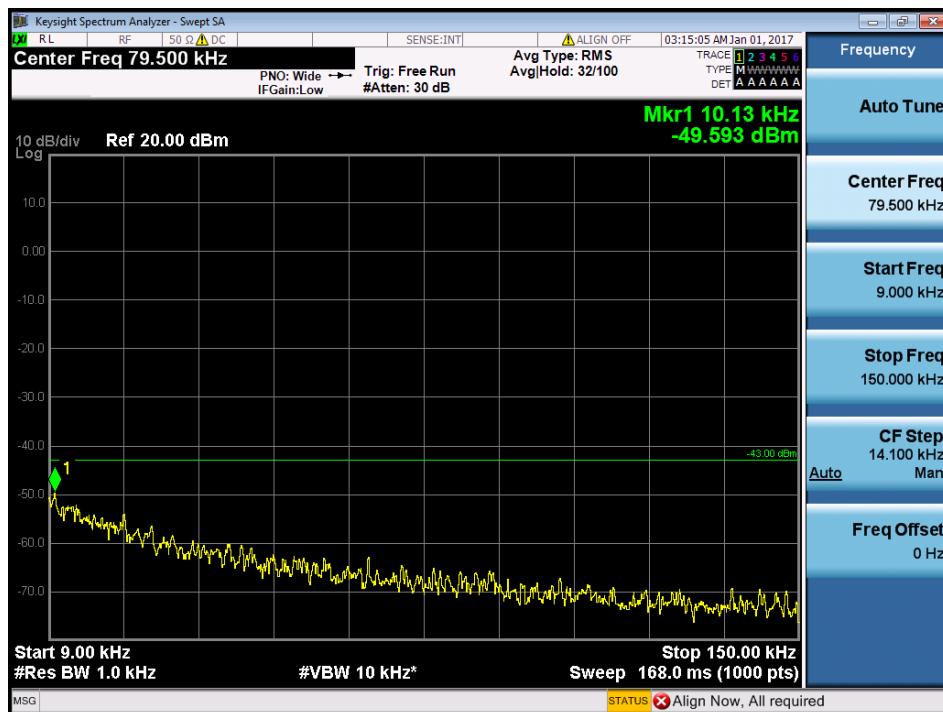


13.6GHz to 20GHz Test Plot

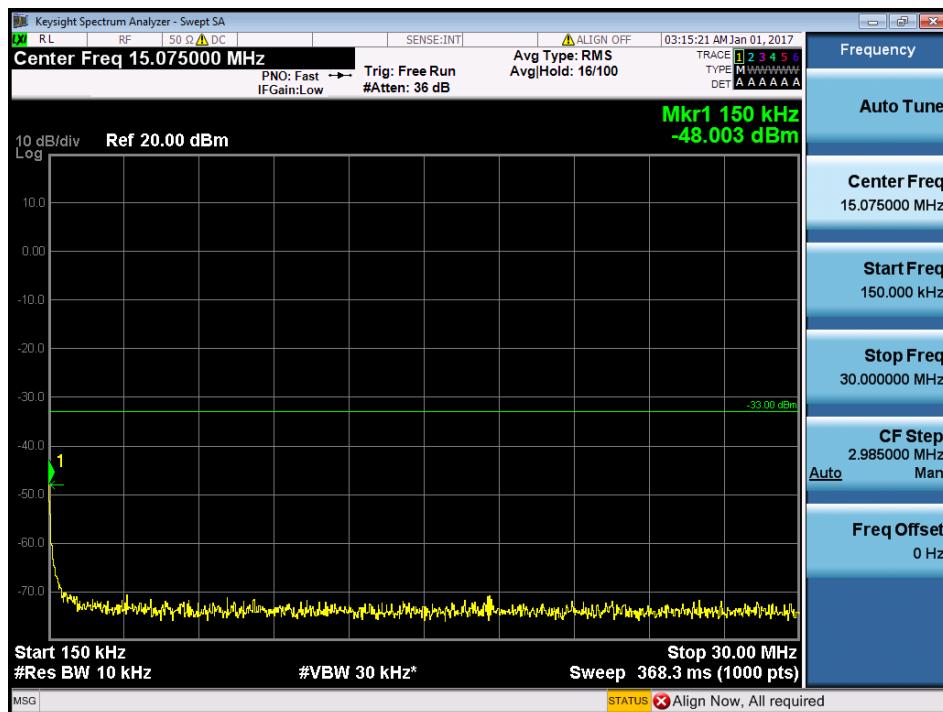


Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	Mid
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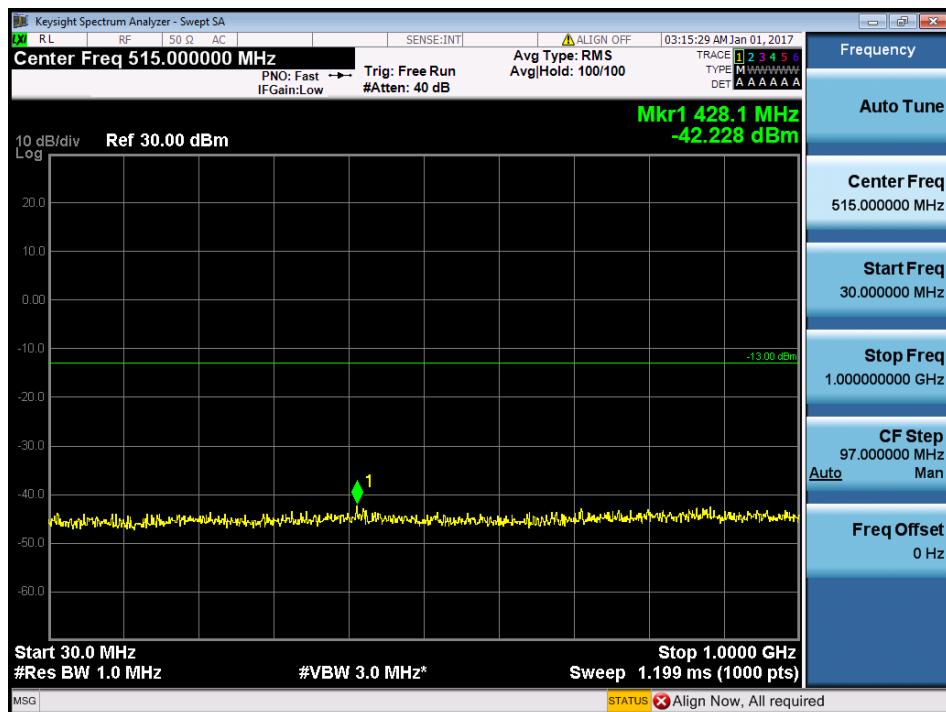
### 9KHz to 150KHz Test Plot



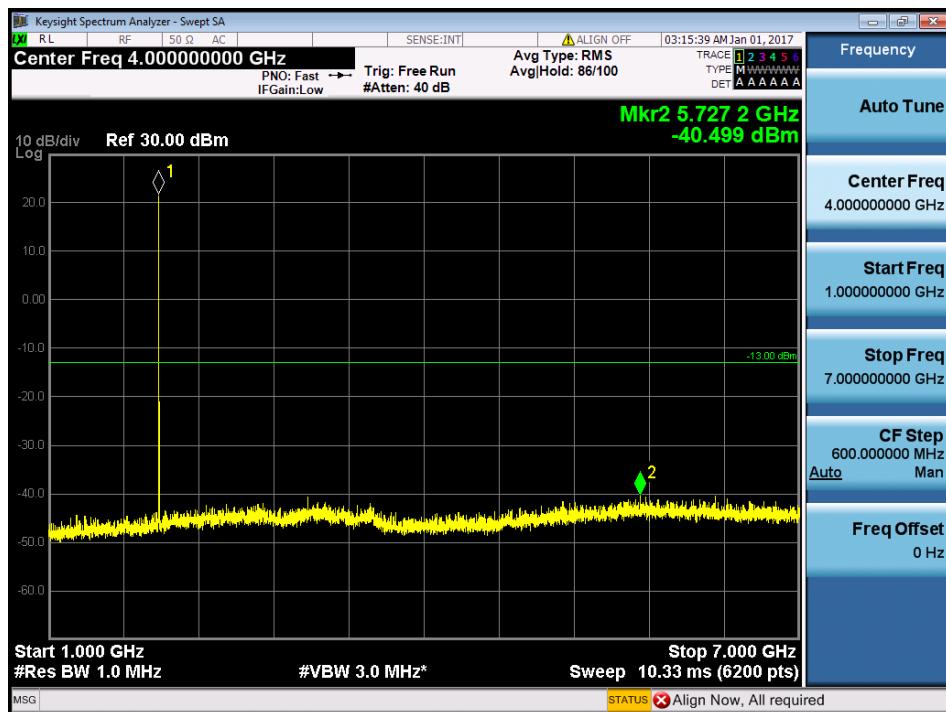
### 150KHz to 30MHz Test Plot



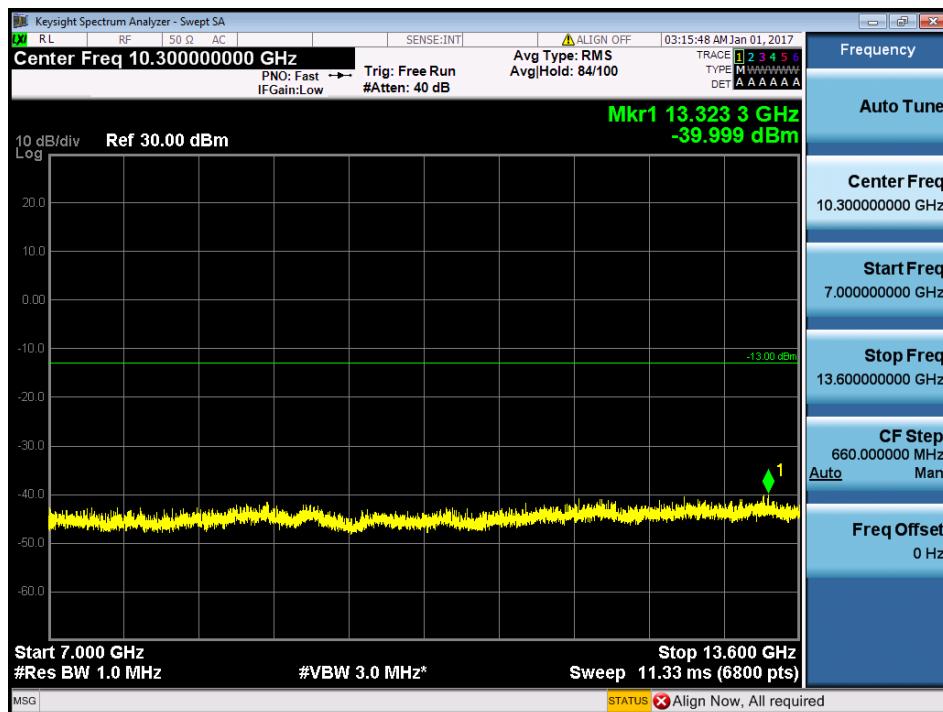
### 30MHz to 1GHz Test Plot



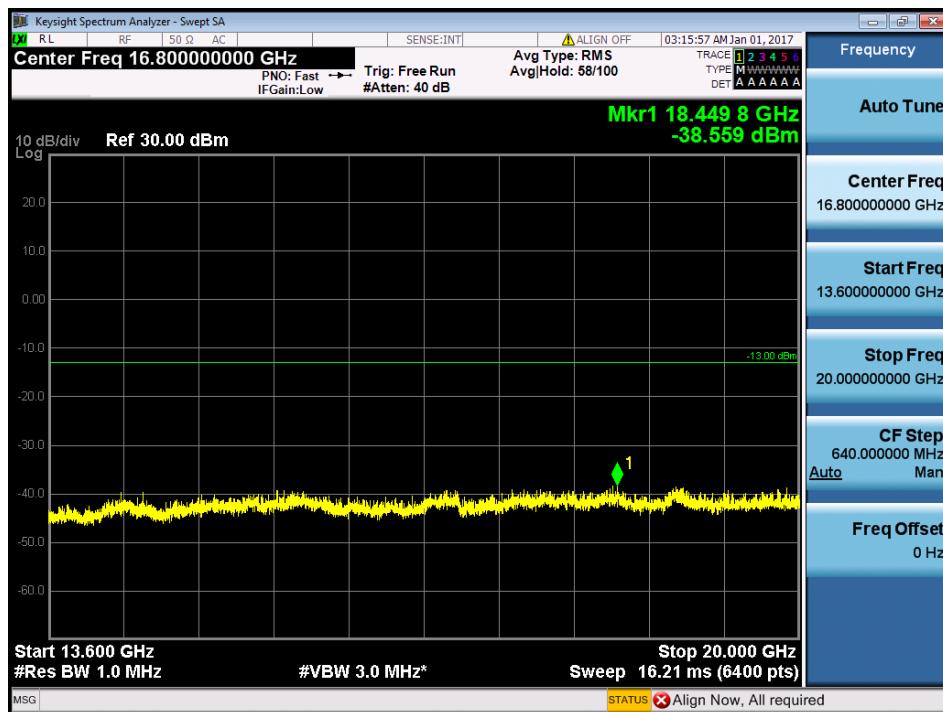
### 1GHz to 7GHz Test Plot



### 7GHz to 13.6GHz Test Plot



### 13.6GHz to 20GHz Test Plot

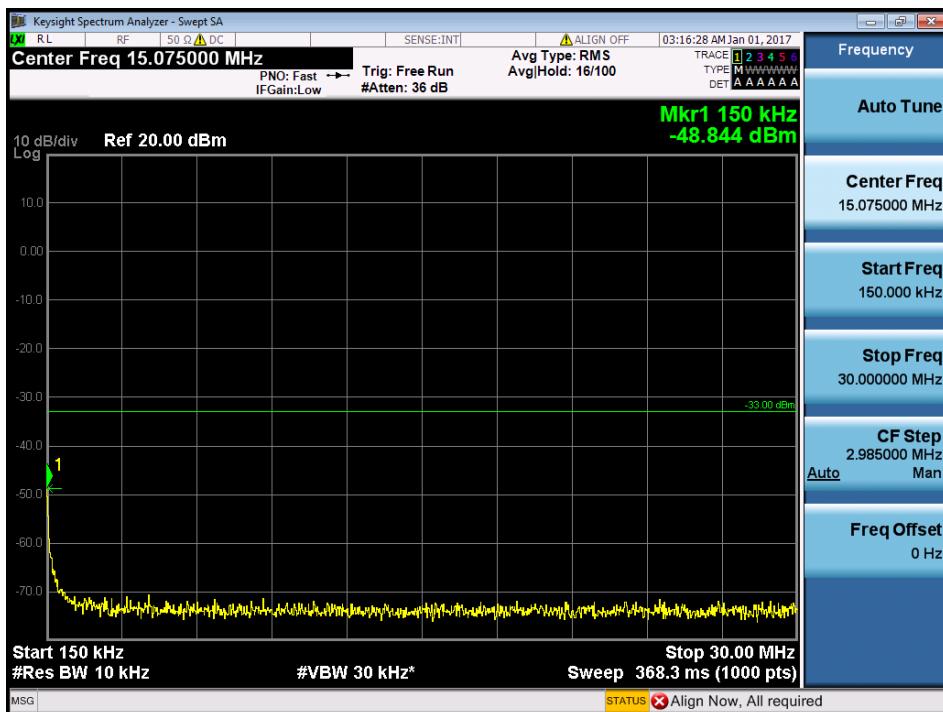


Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	High
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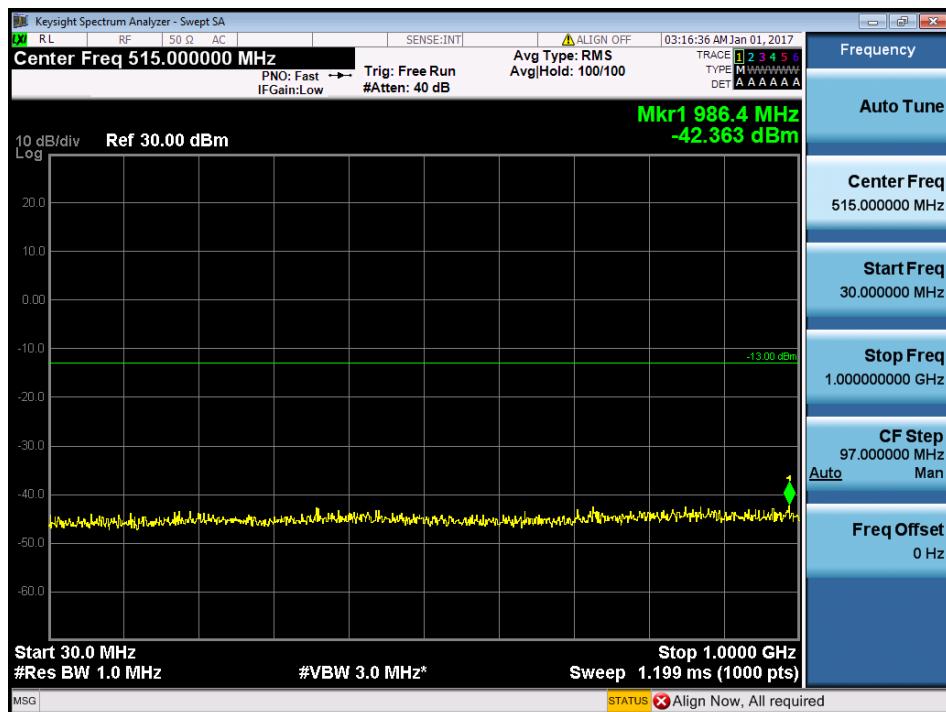
### 9KHz to 150KHz Test Plot



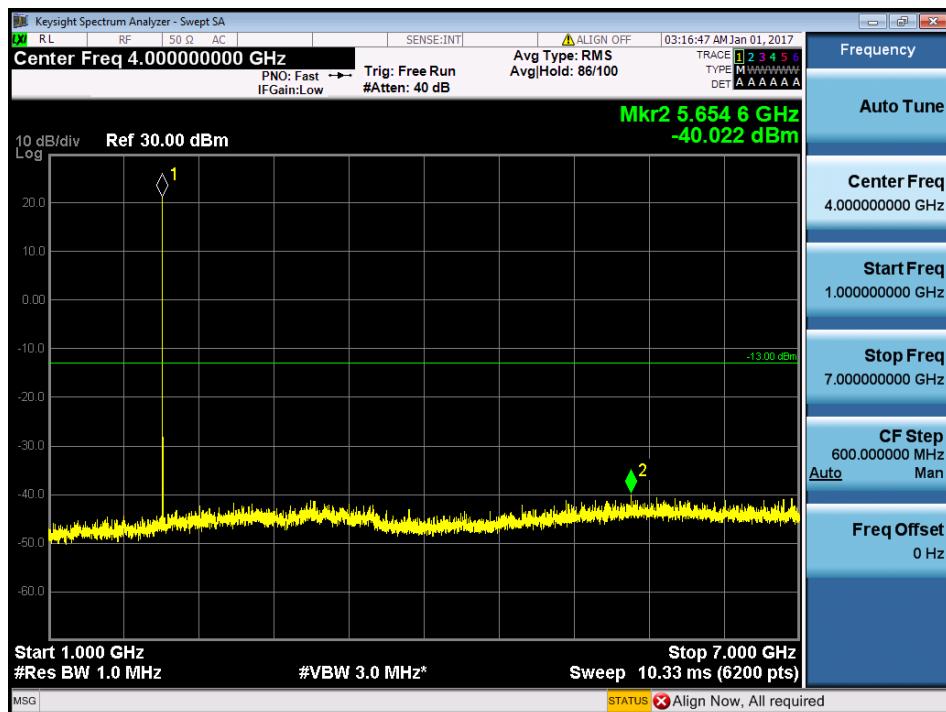
### 150KHz to 30MHz Test Plot



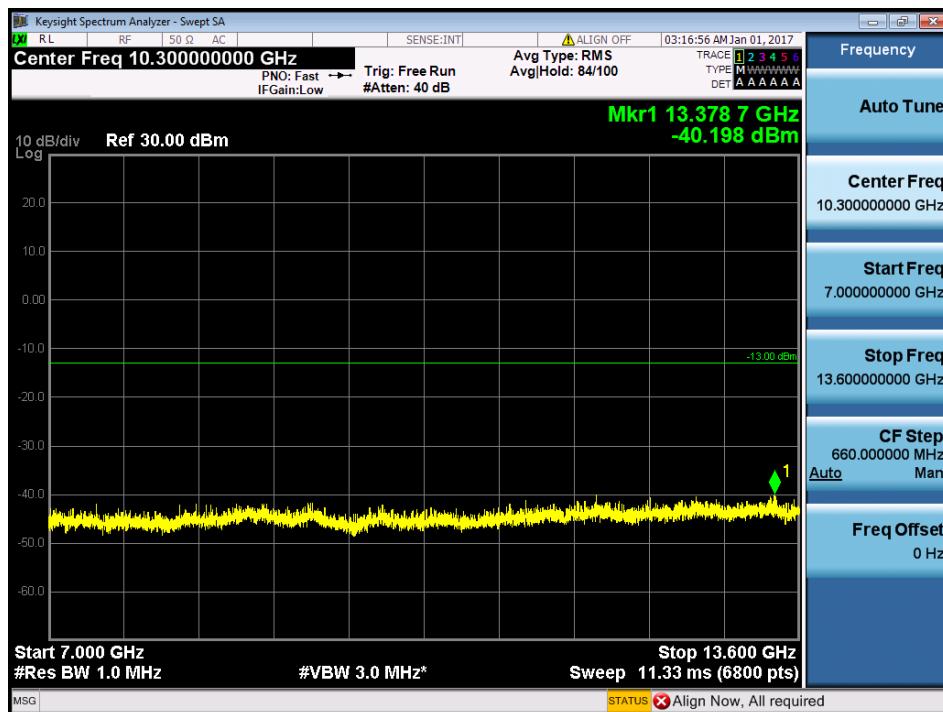
### 30MHz to 1GHz Test Plot



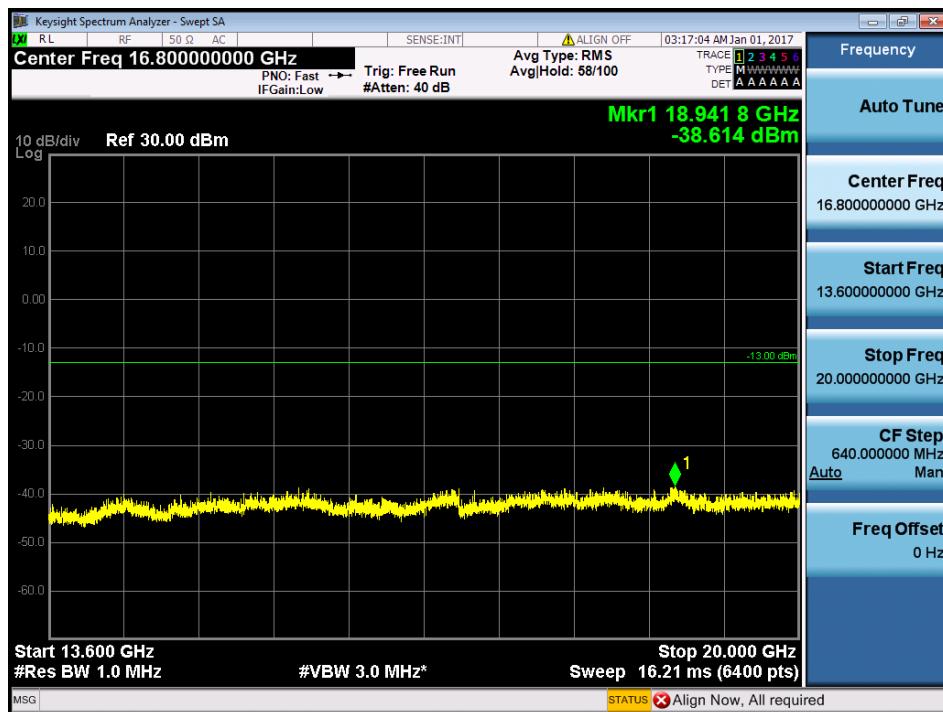
### 1GHz to 7GHz Test Plot



### 7GHz to 13.6GHz Test Plot

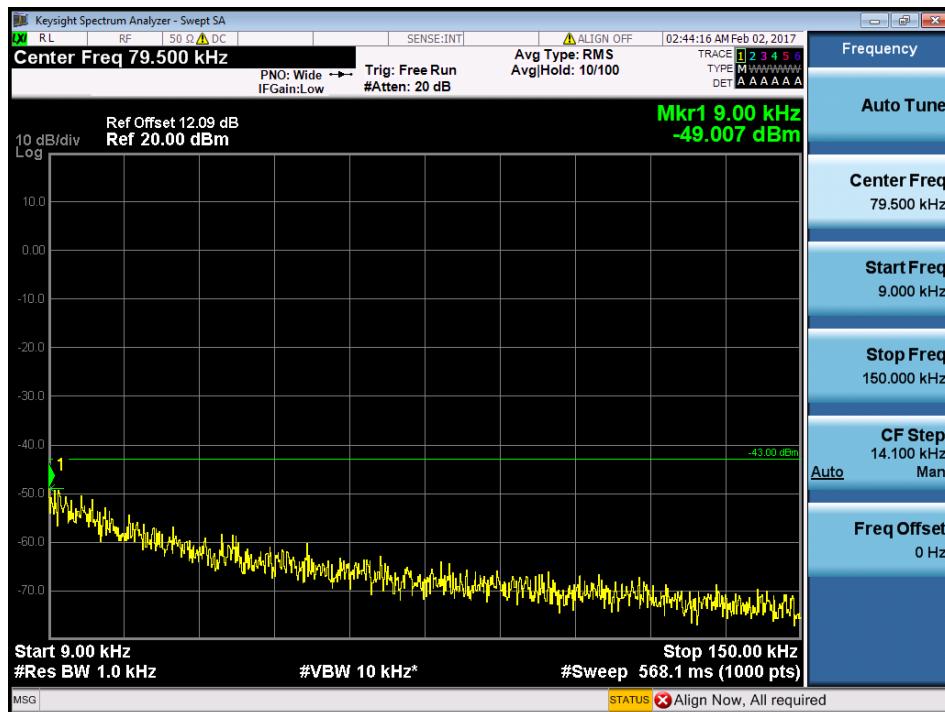


### 13.6GHz to 20GHz Test Plot

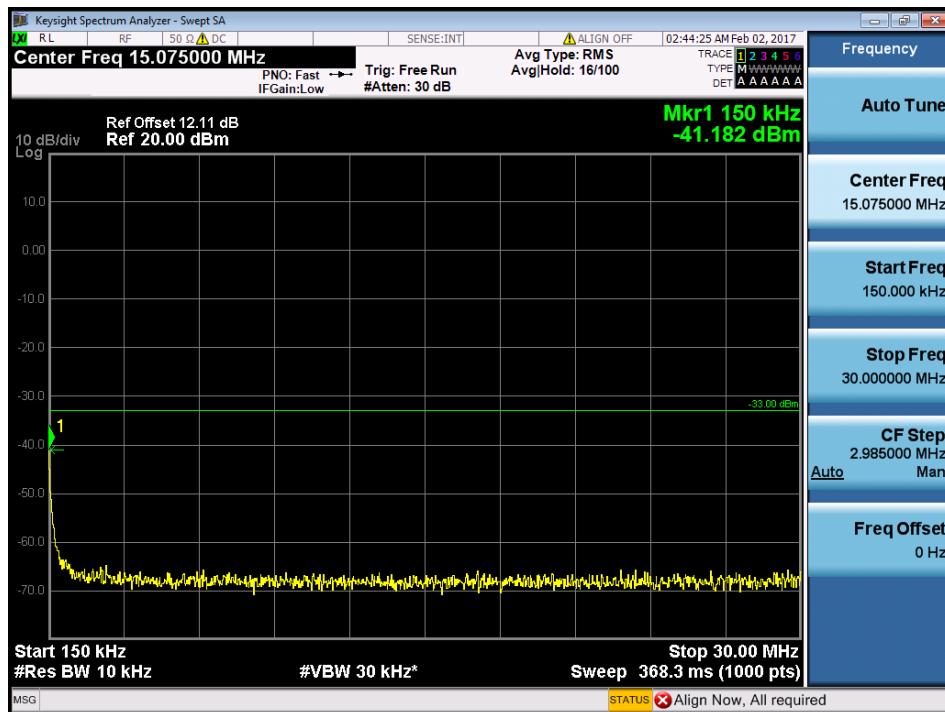


Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	Low
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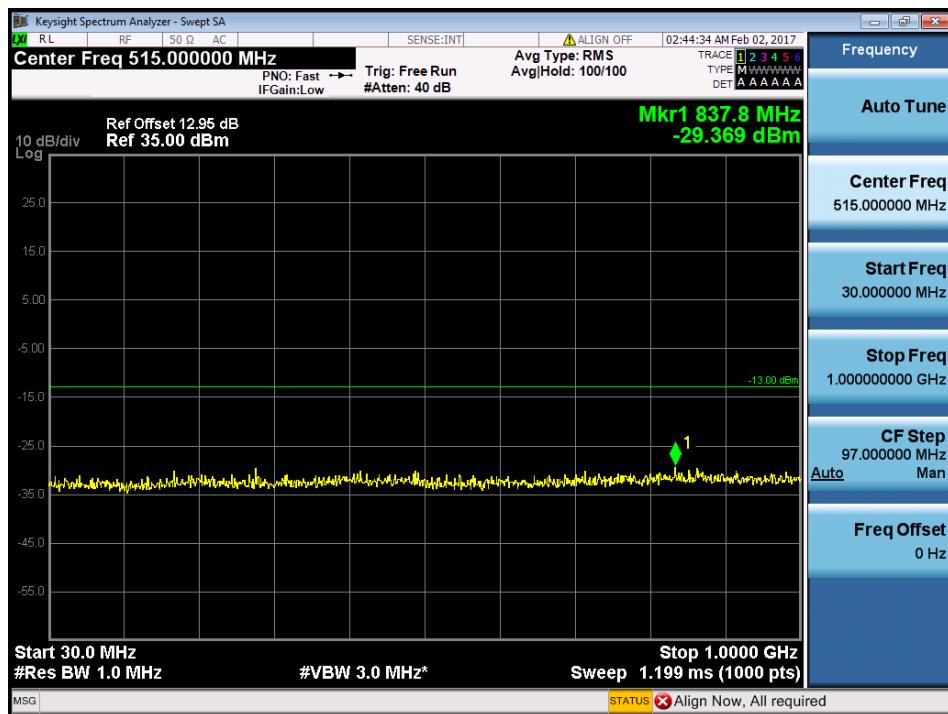
### 9KHz to 150KHz Test Plot



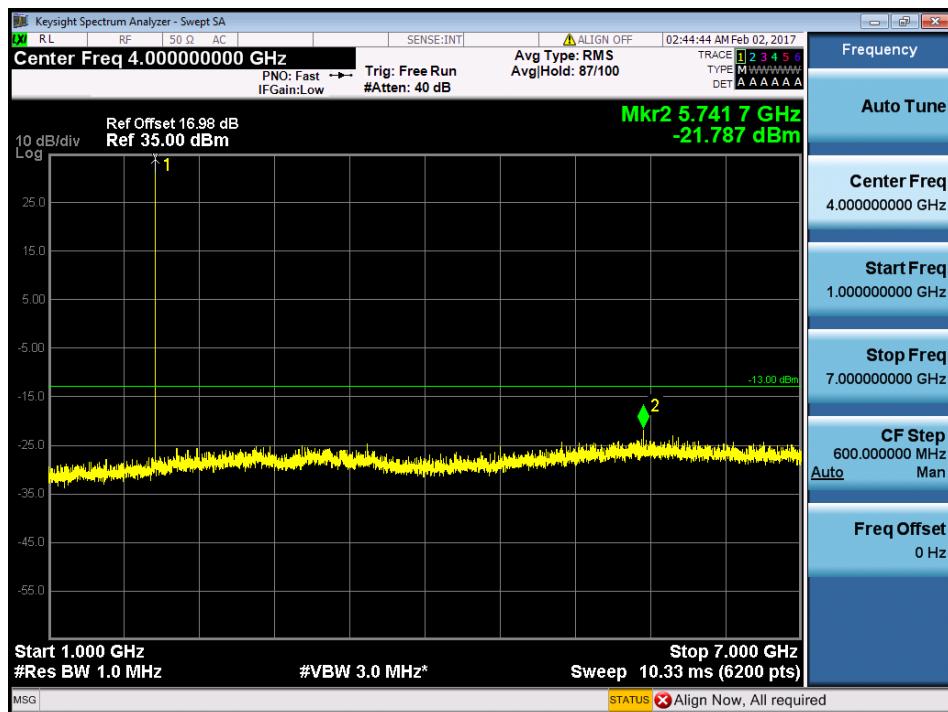
### 150KHz to 30MHz Test Plot



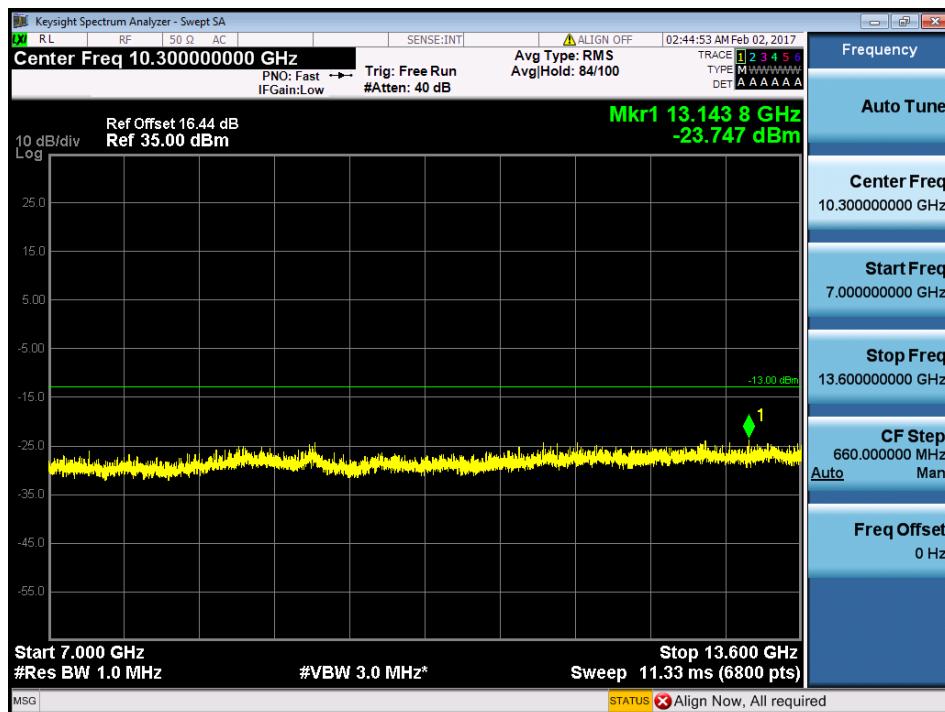
### 30MHz to 1GHz Test Plot



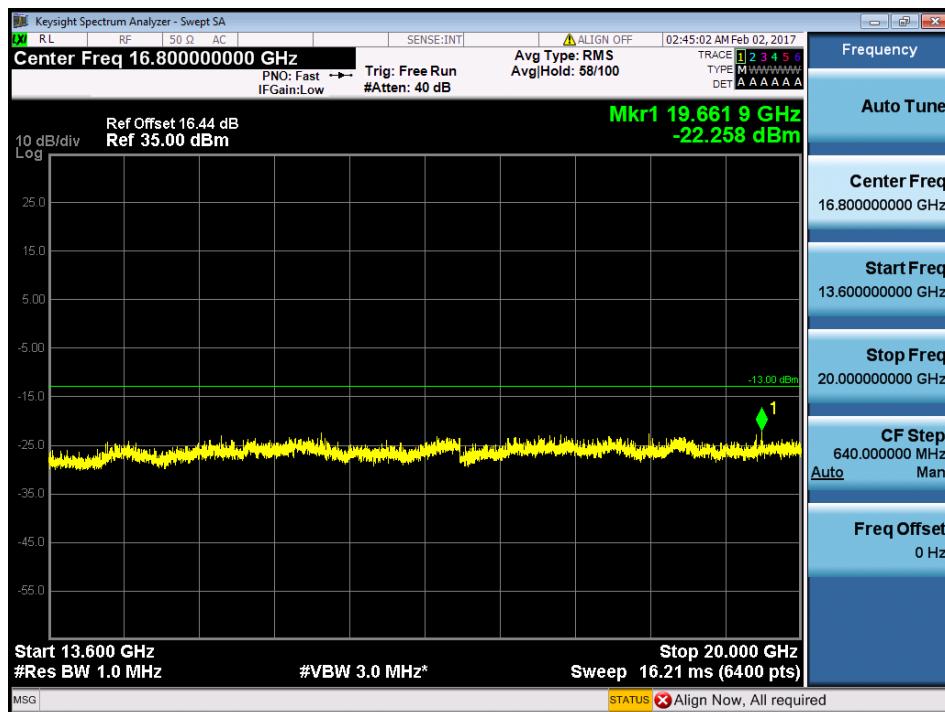
### 1GHz to 7GHz Test Plot



7GHz to 13.6GHz Test Plot

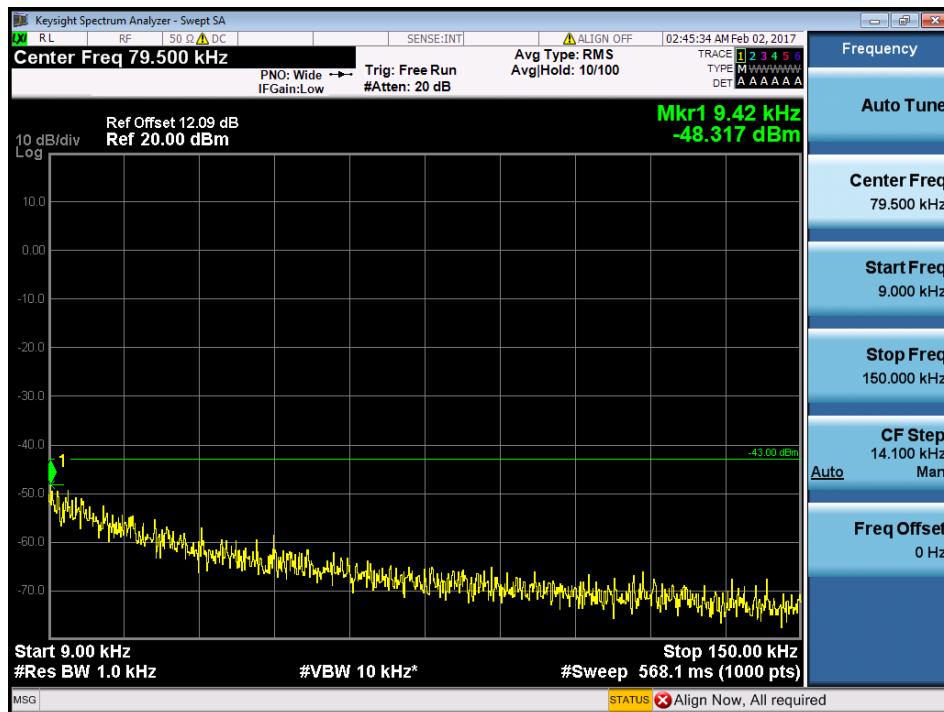


13.6GHz to 20GHz Test Plot

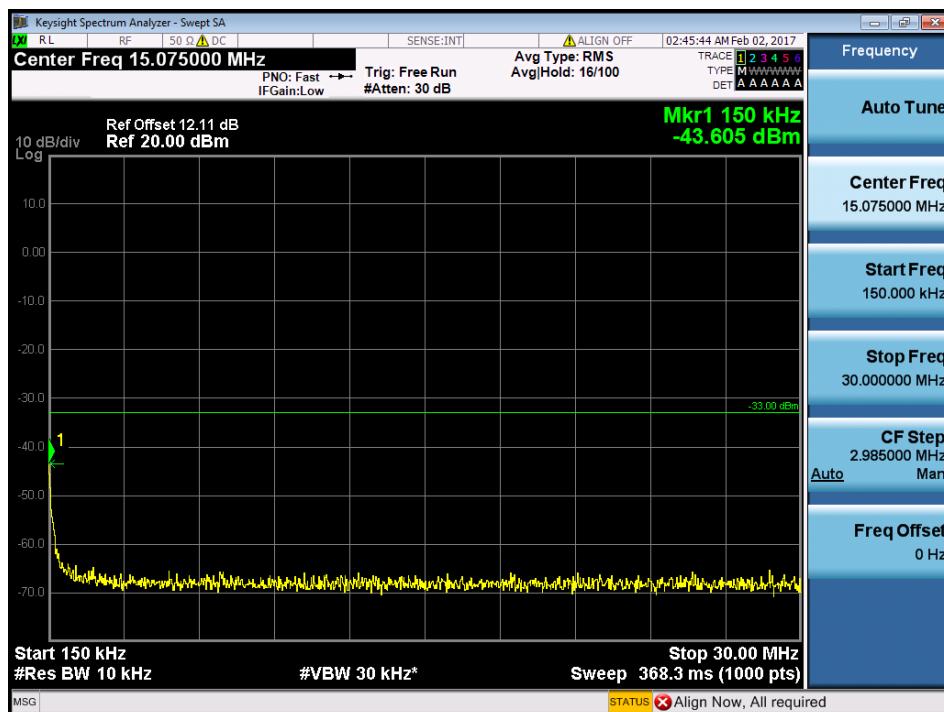


Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	Mid
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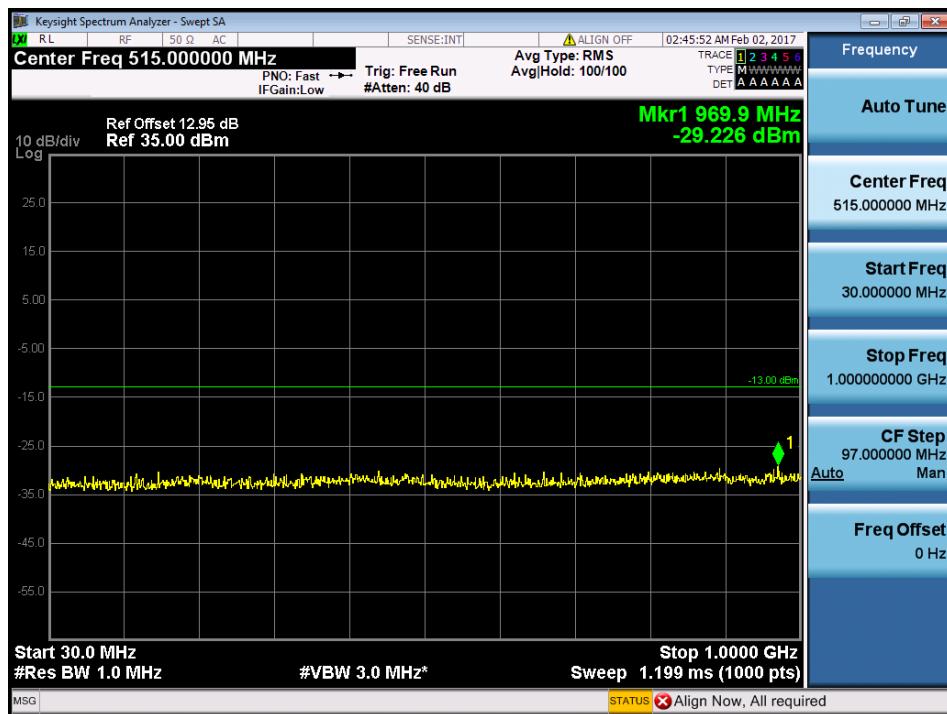
### 9KHz to 150KHz Test Plot



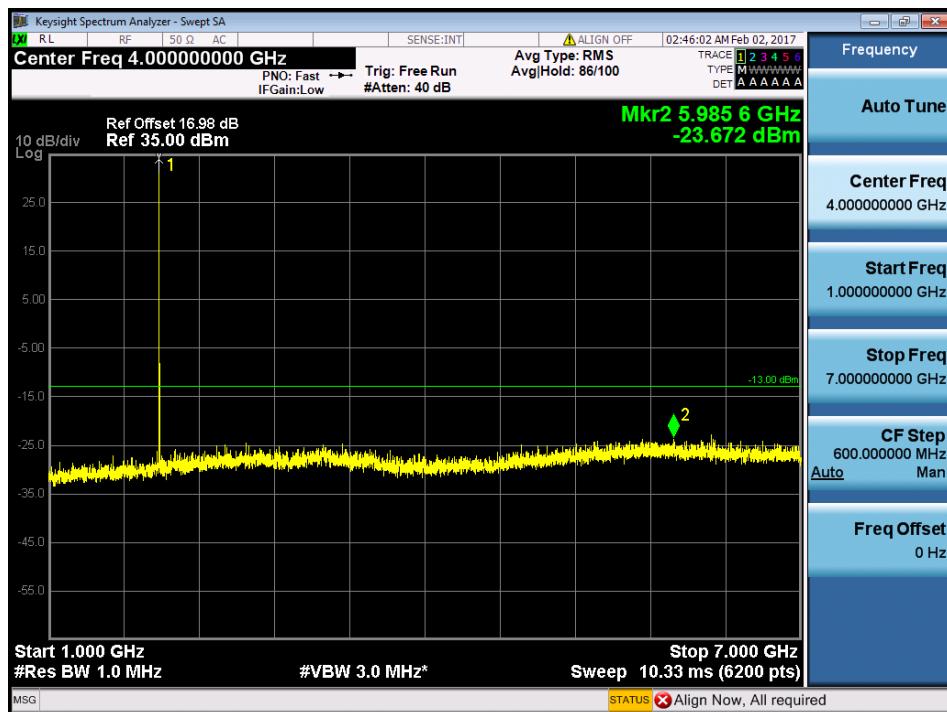
### 150KHz to 30MHz Test Plot



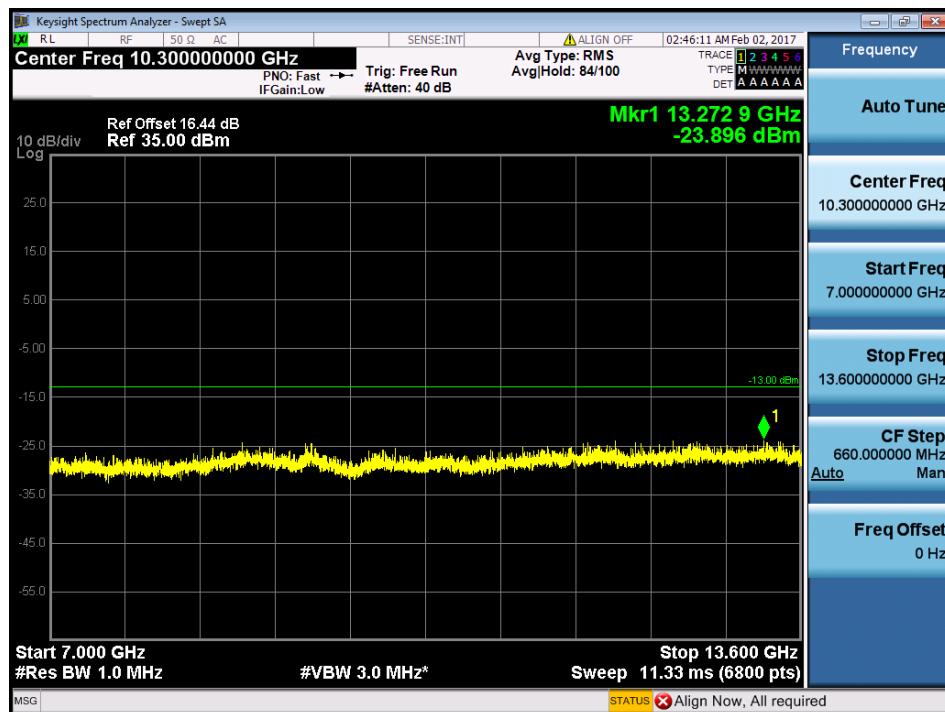
### 30MHz to 1GHz Test Plot



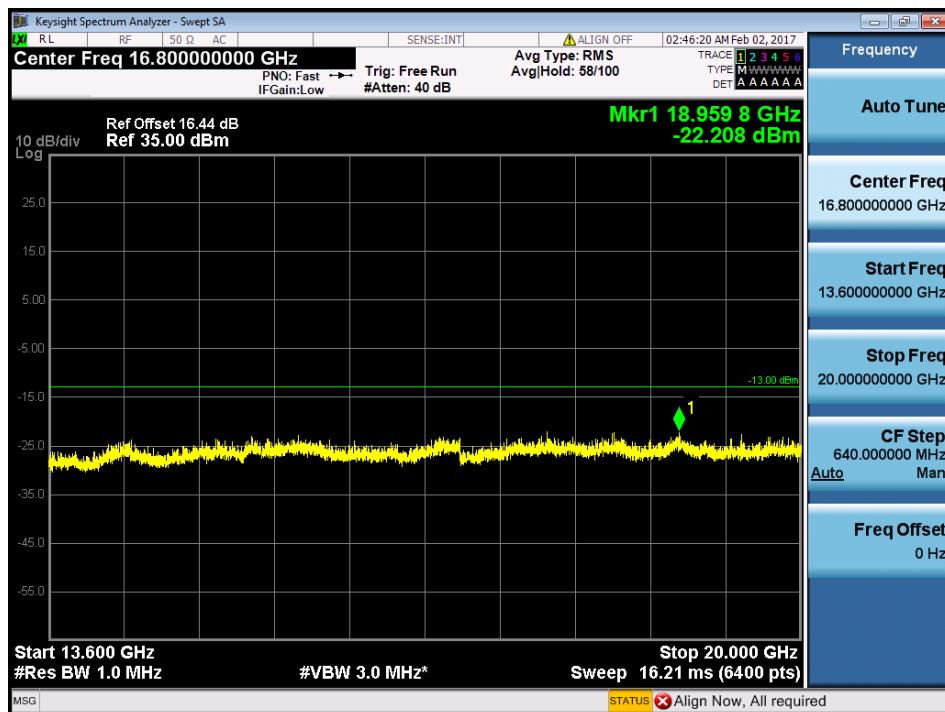
### 1GHz to 7GHz Test Plot



7GHz to 13.6GHz Test Plot

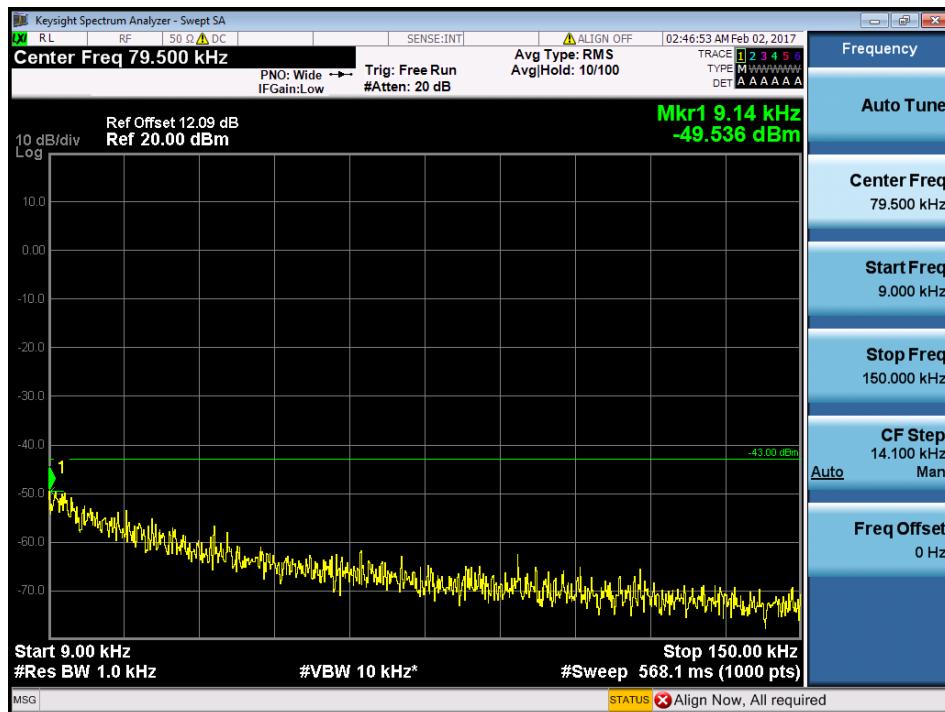


13.6GHz to 20GHz Test Plot

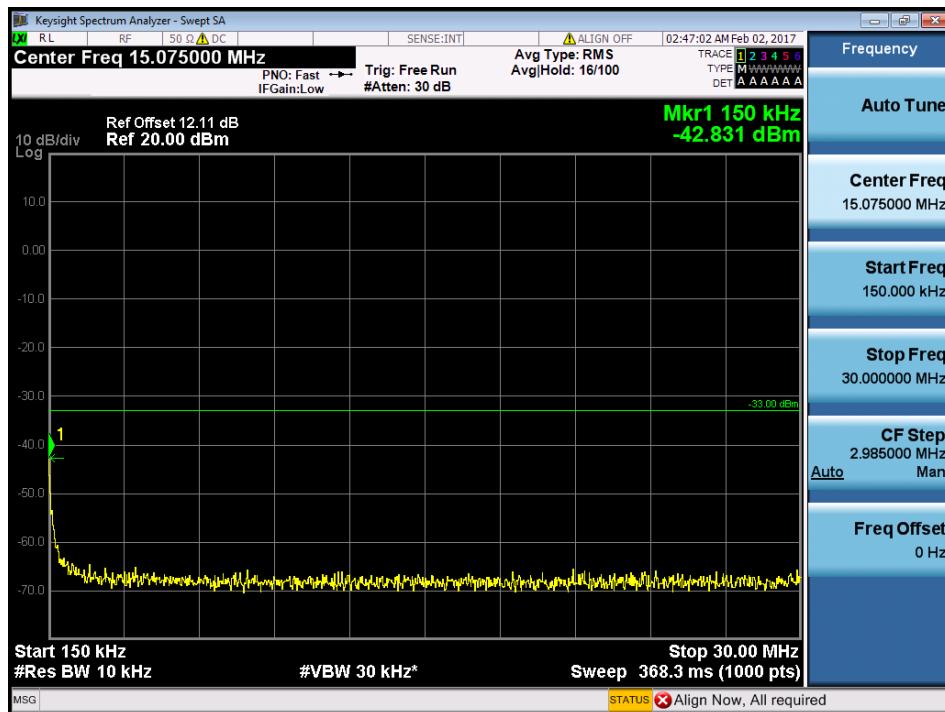


Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	High
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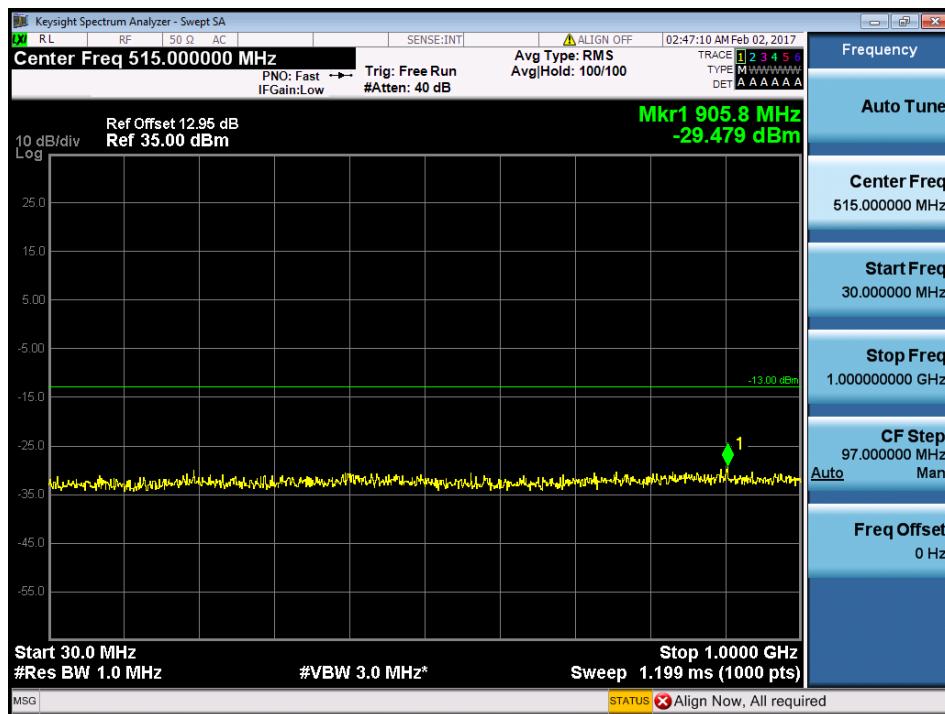
### 9KHz to 150KHz Test Plot



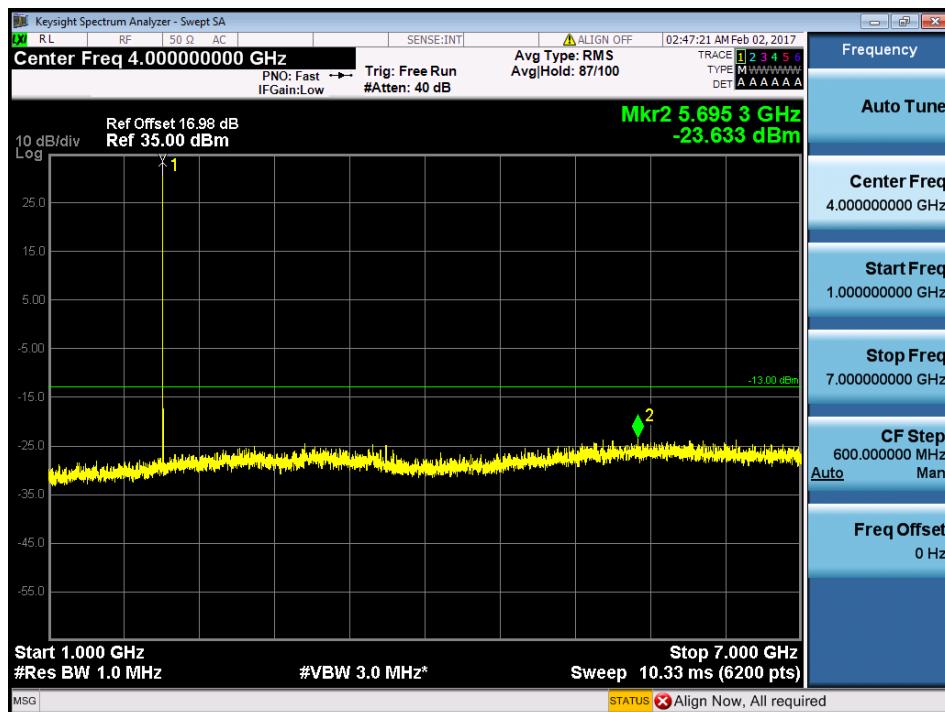
### 150KHz to 30MHz Test Plot



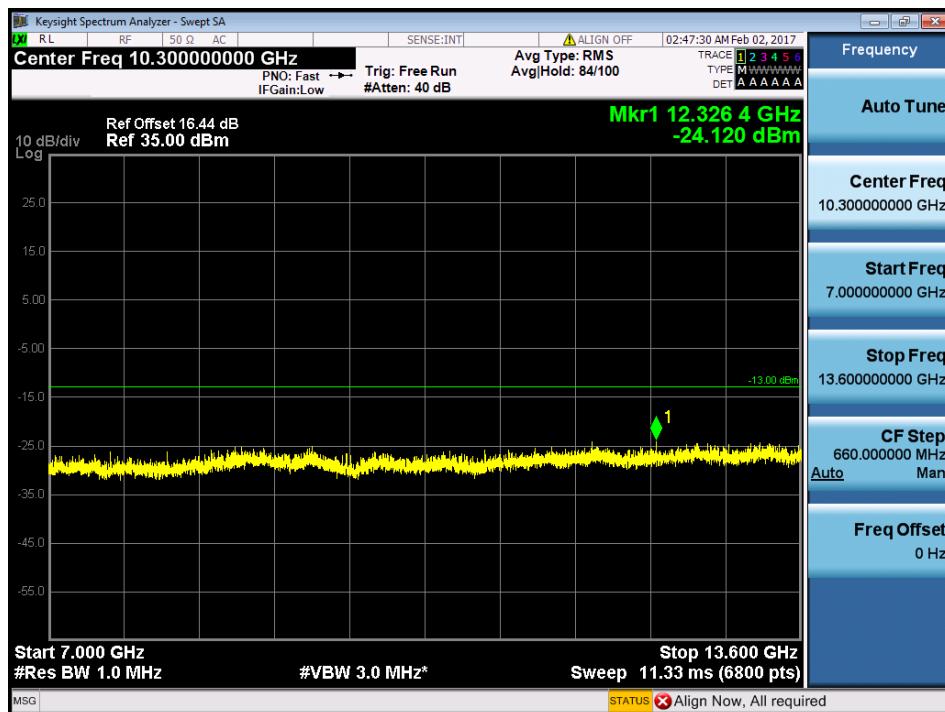
### 30MHz to 1GHz Test Plot



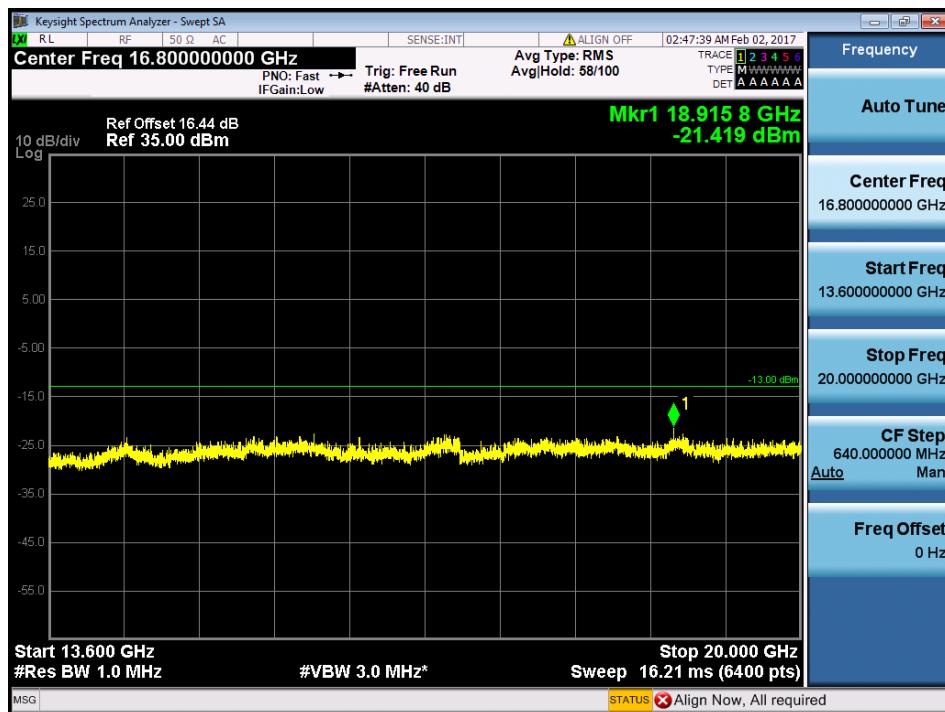
### 1GHz to 7GHz Test Plot



7GHz to 13.6GHz Test Plot

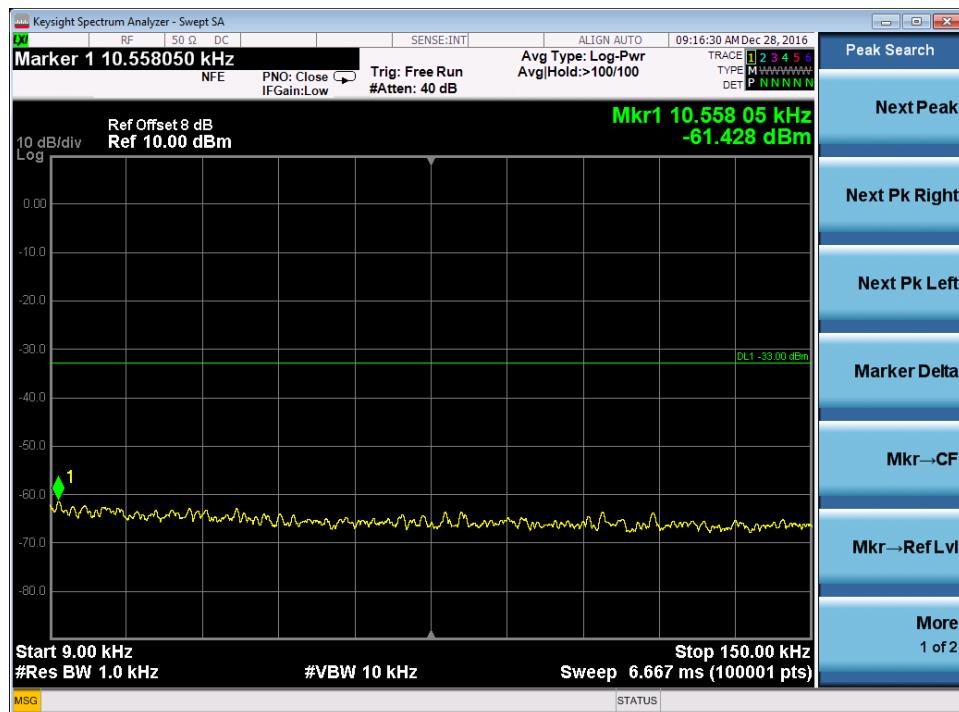


13.6GHz to 20GHz Test Plot

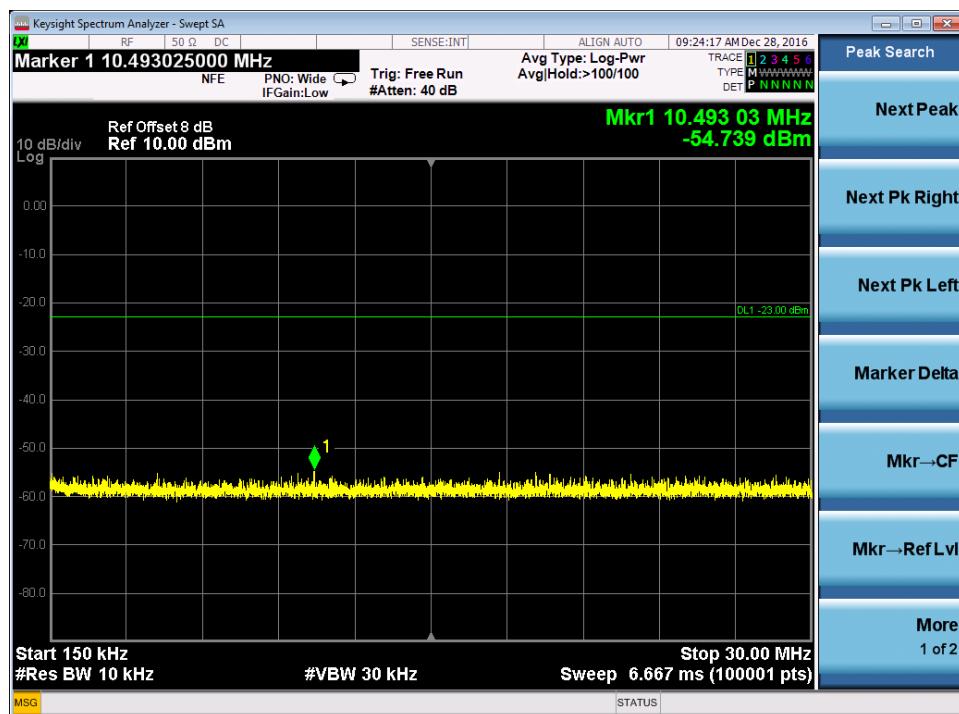


Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Low
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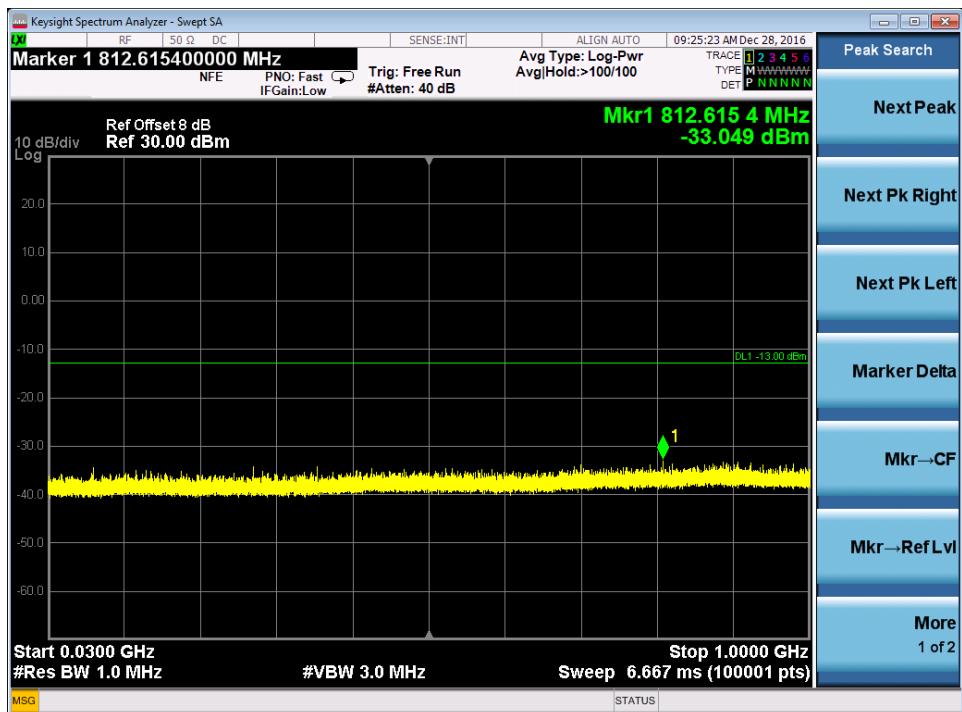
### 9KHz to 150KHz Test Plot



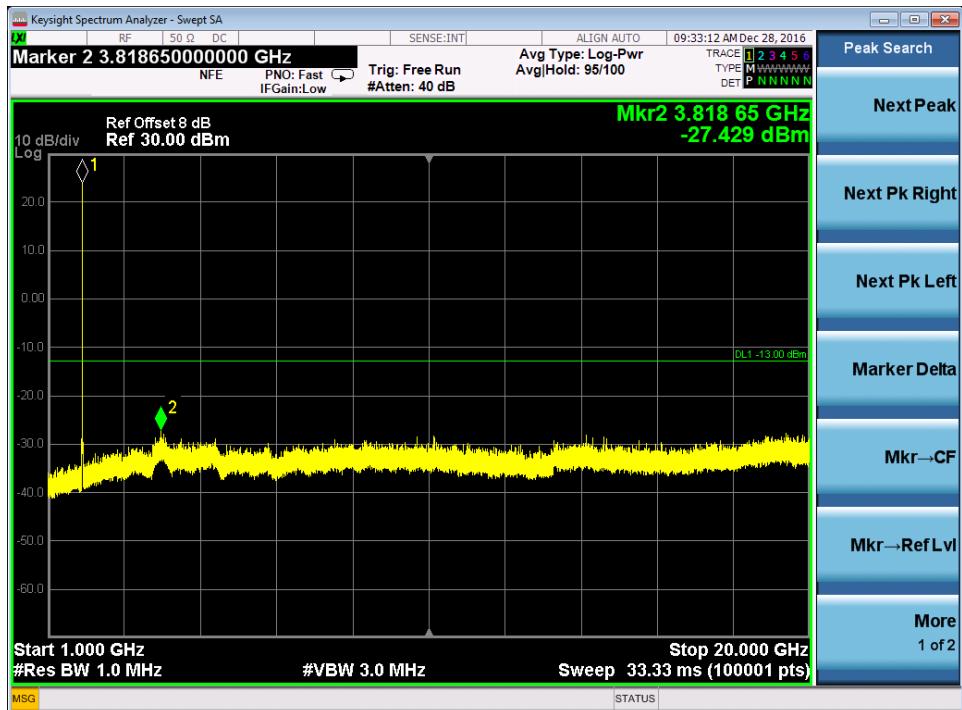
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

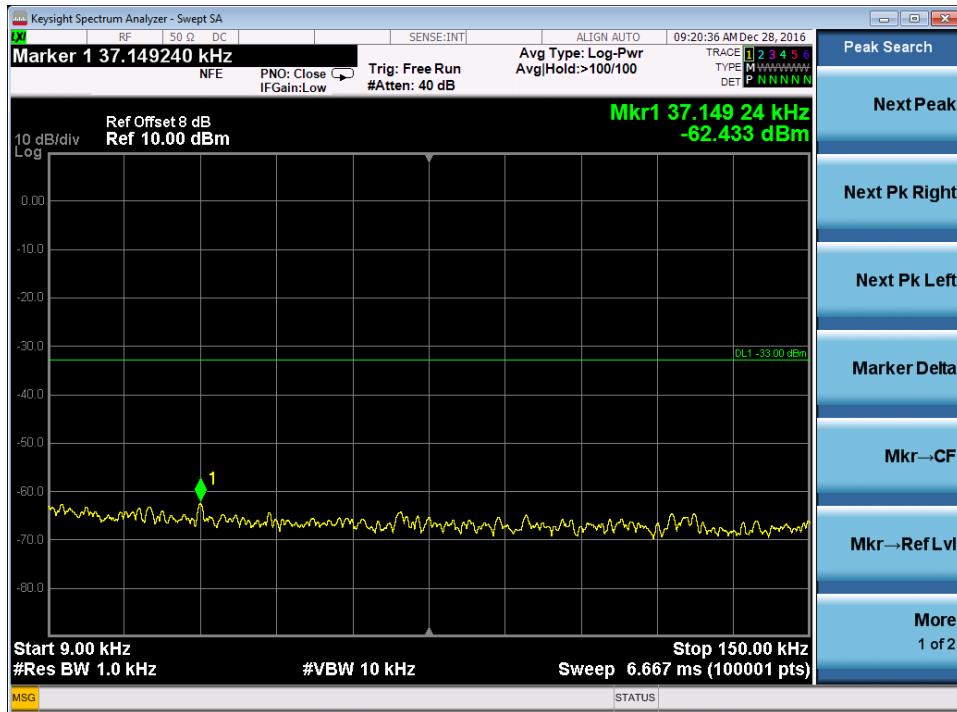


### 1GHz to 20GHz Test Plot

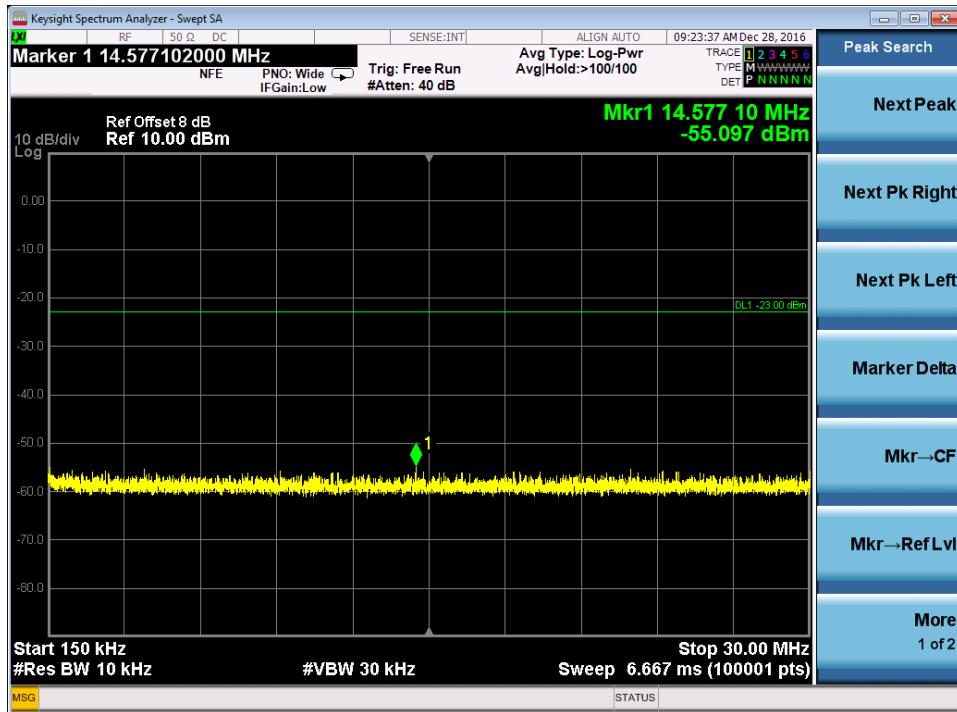


Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Mid
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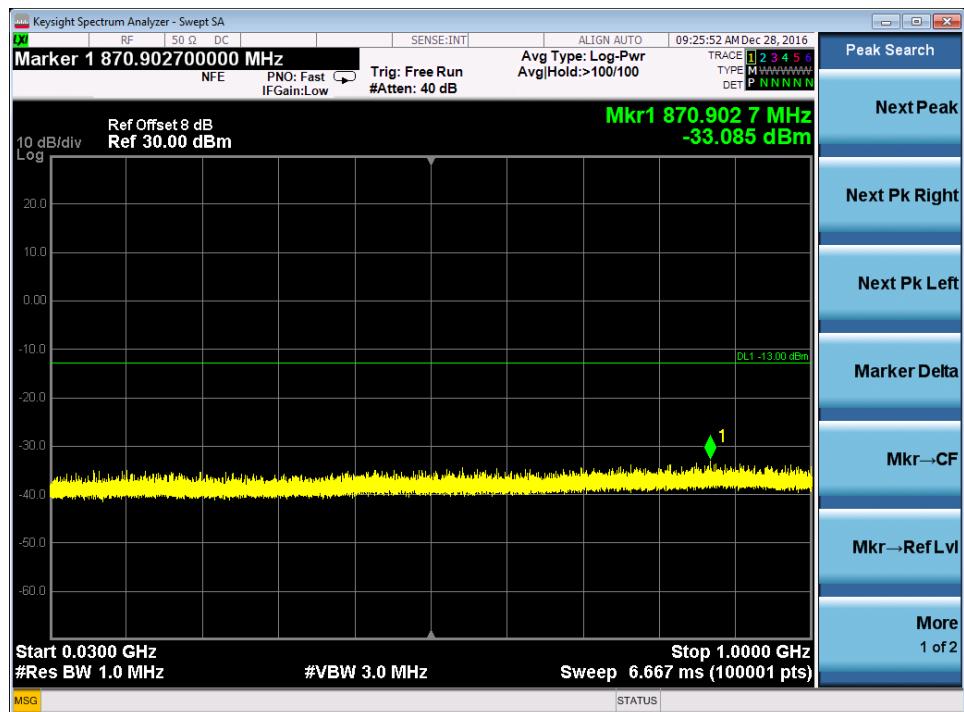
### 9KHz to 150KHz Test Plot



### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

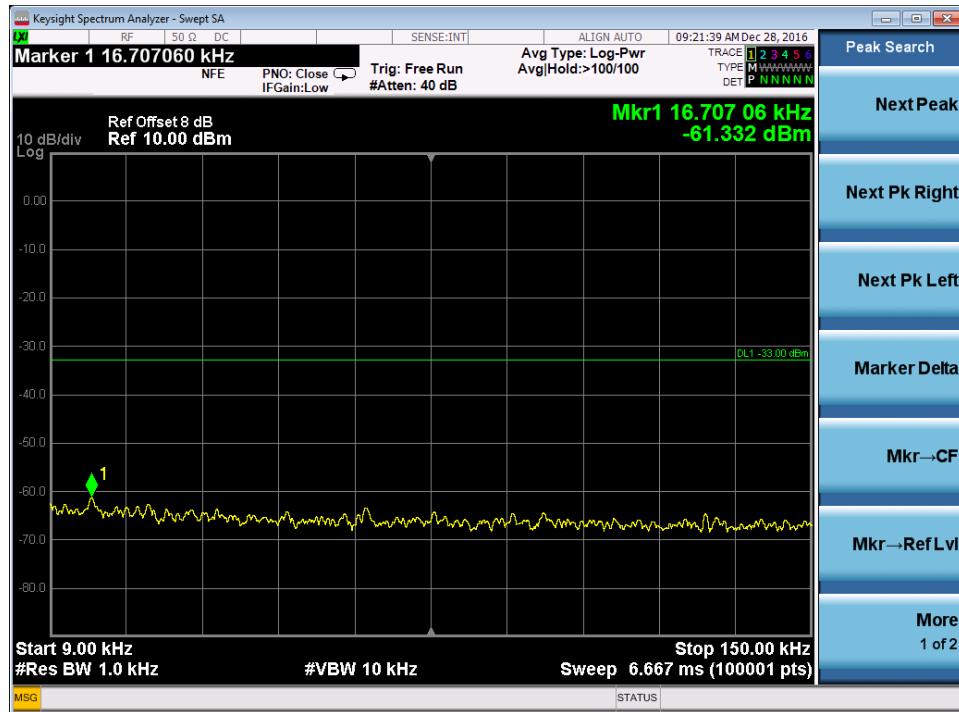


### 1GHz to 20GHz Test Plot

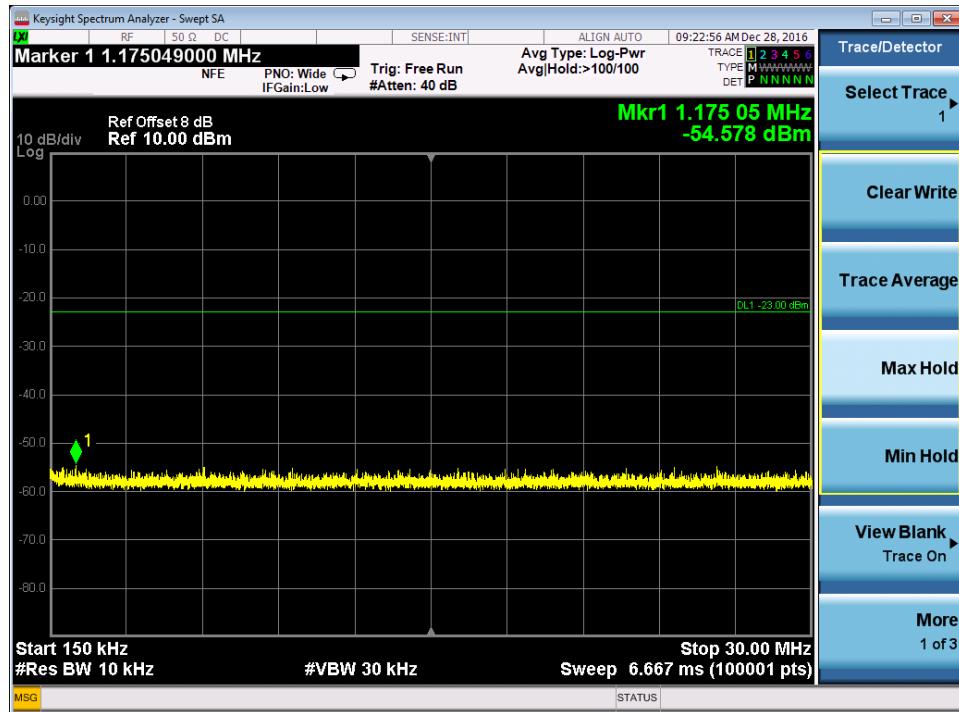


Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	High
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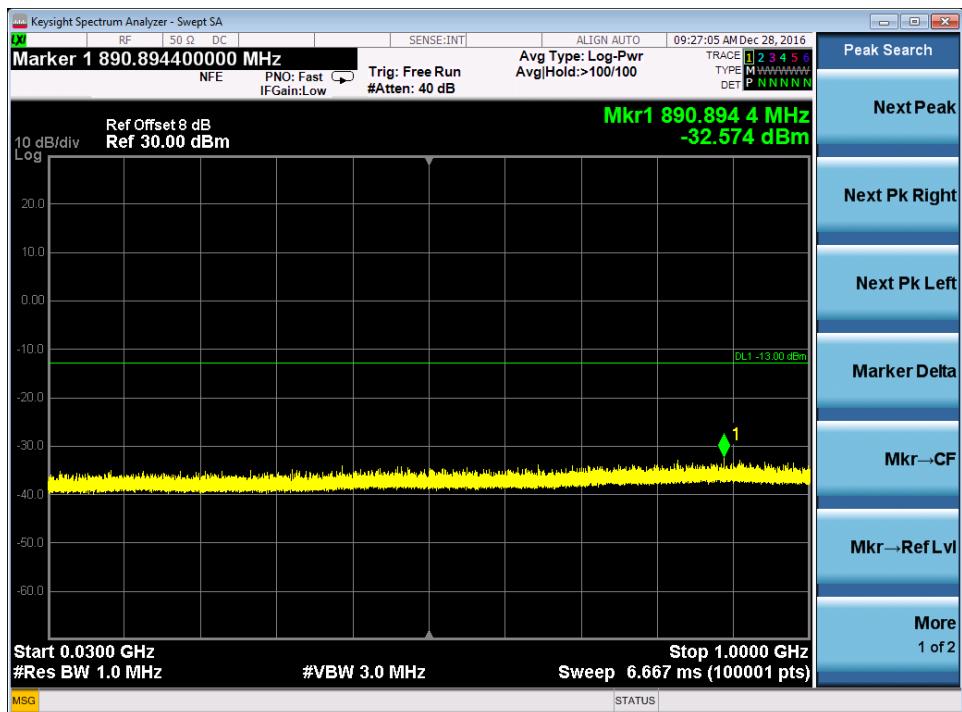
### 9KHz to 150KHz Test Plot



### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

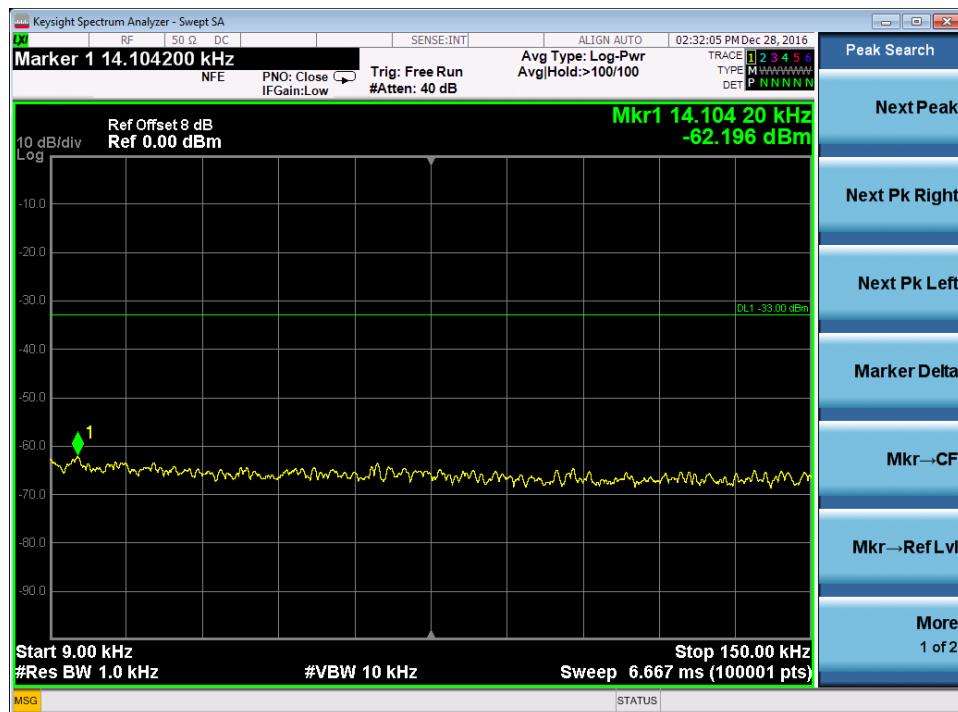


### 1GHz to 20GHz Test Plot

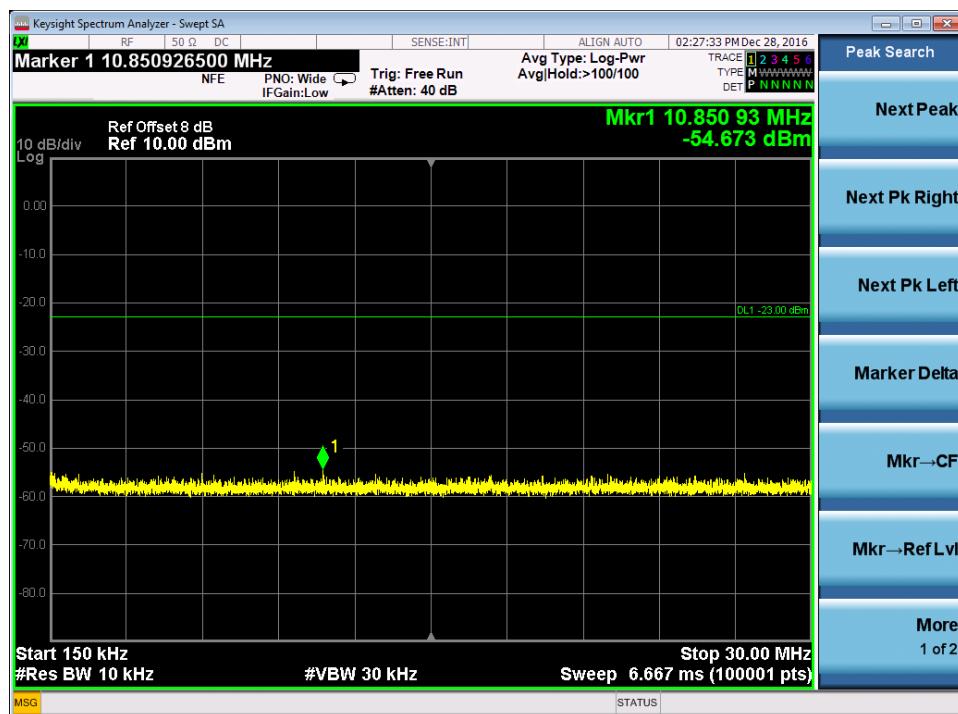


Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Low
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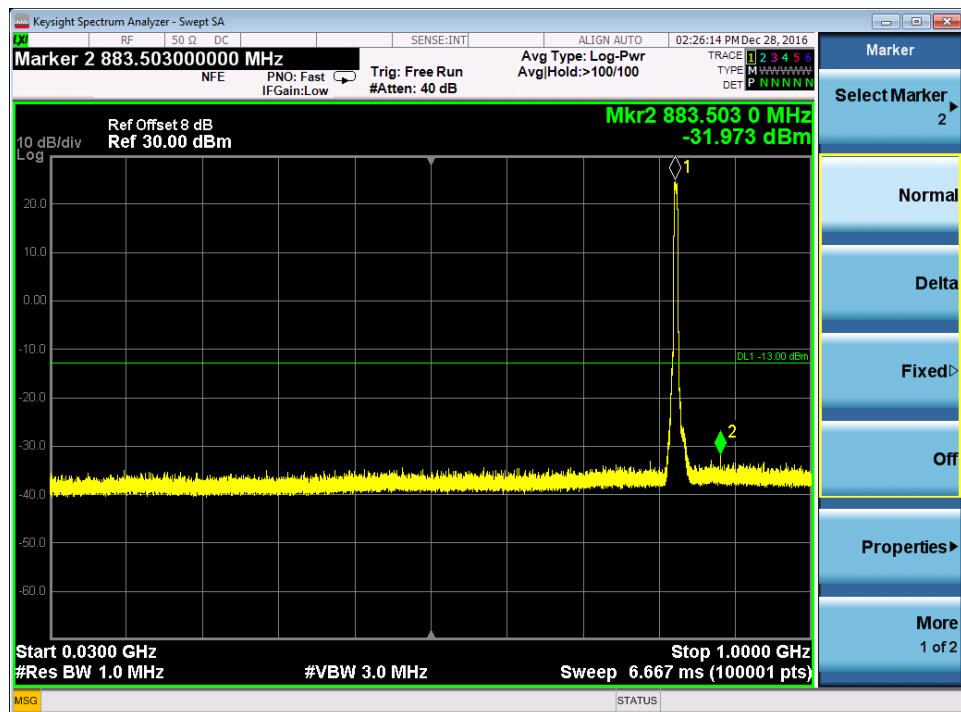
### 9KHz to 150KHz Test Plot



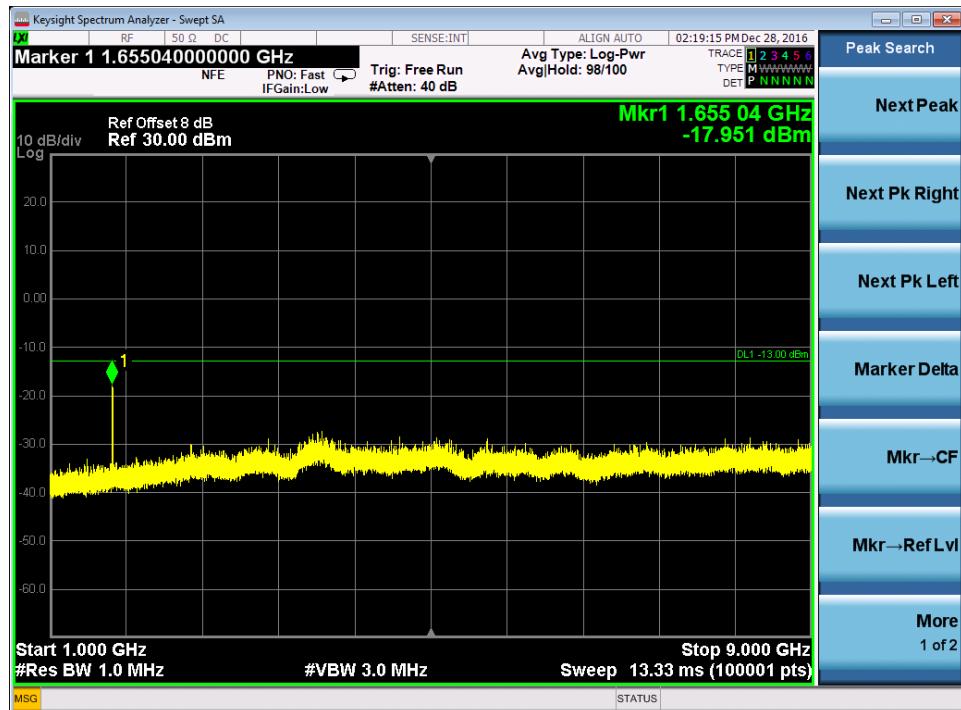
### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

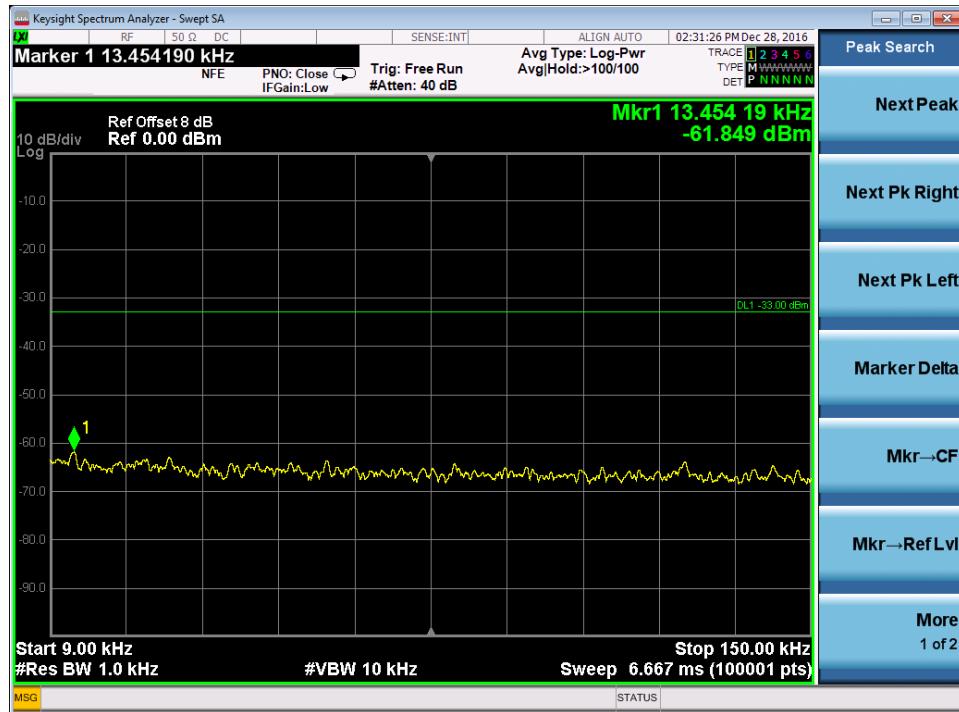


### 1GHz to 20GHz Test Plot

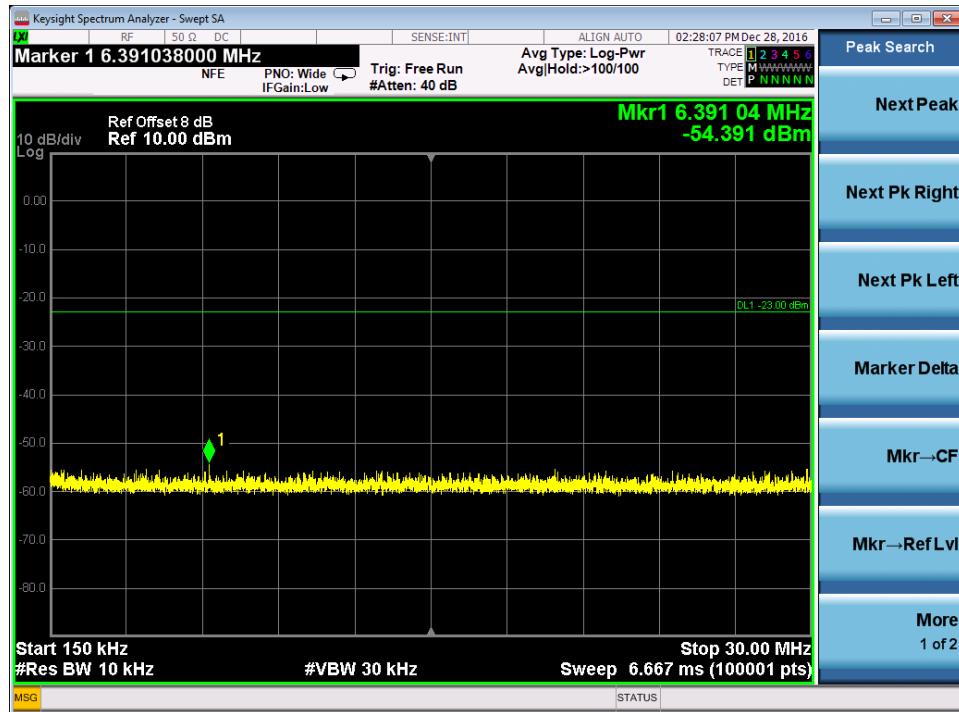


Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Mid
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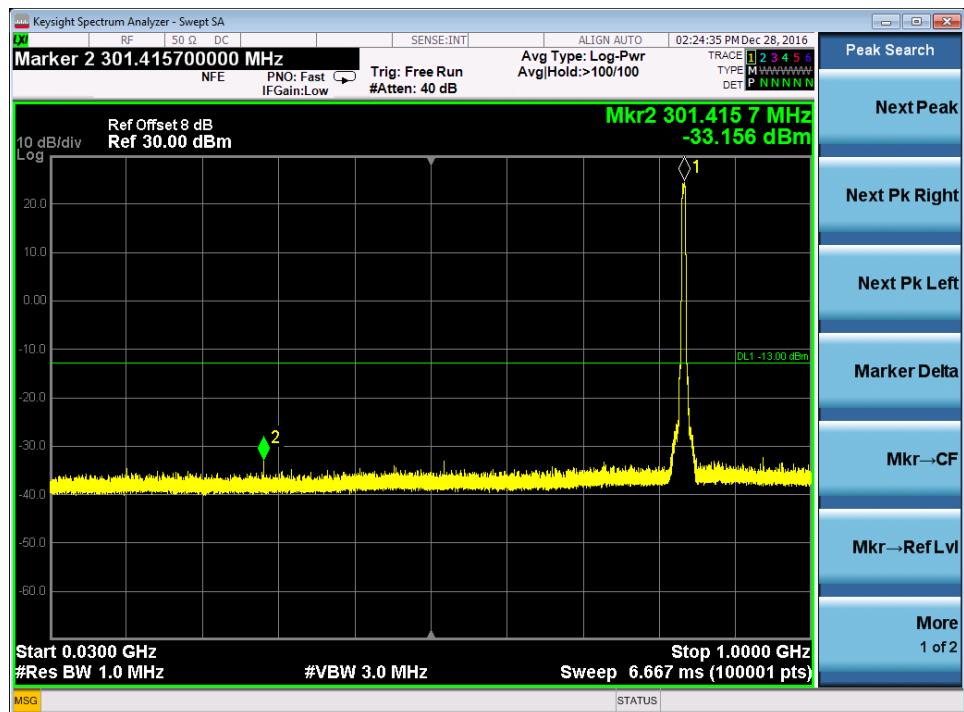
### 9KHz to 150KHz Test Plot



### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot

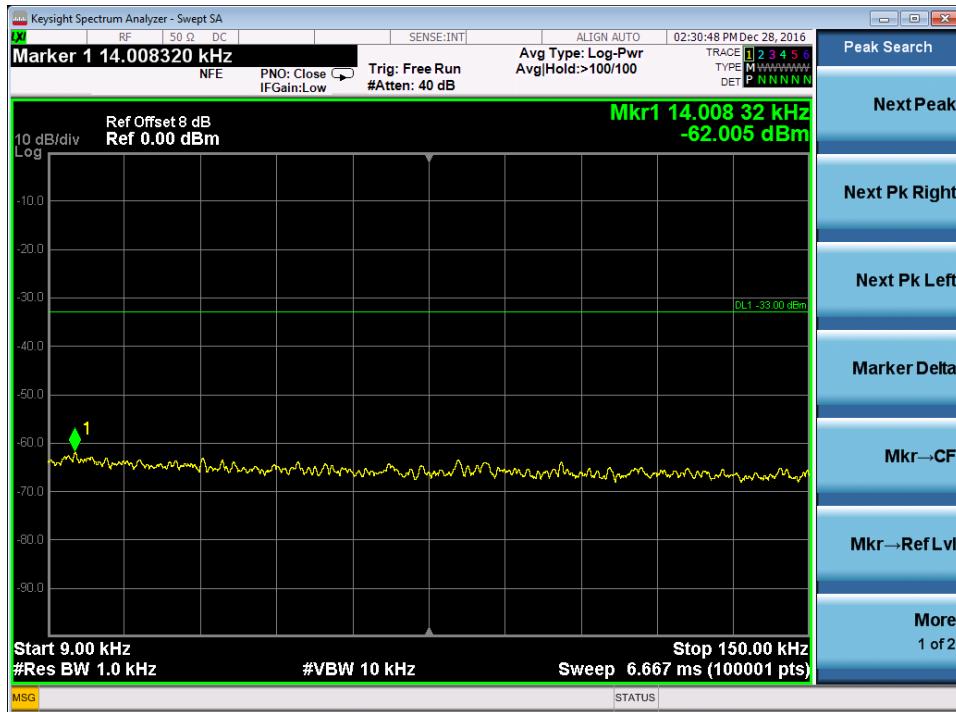


### 1GHz to 9GHz Test Plot

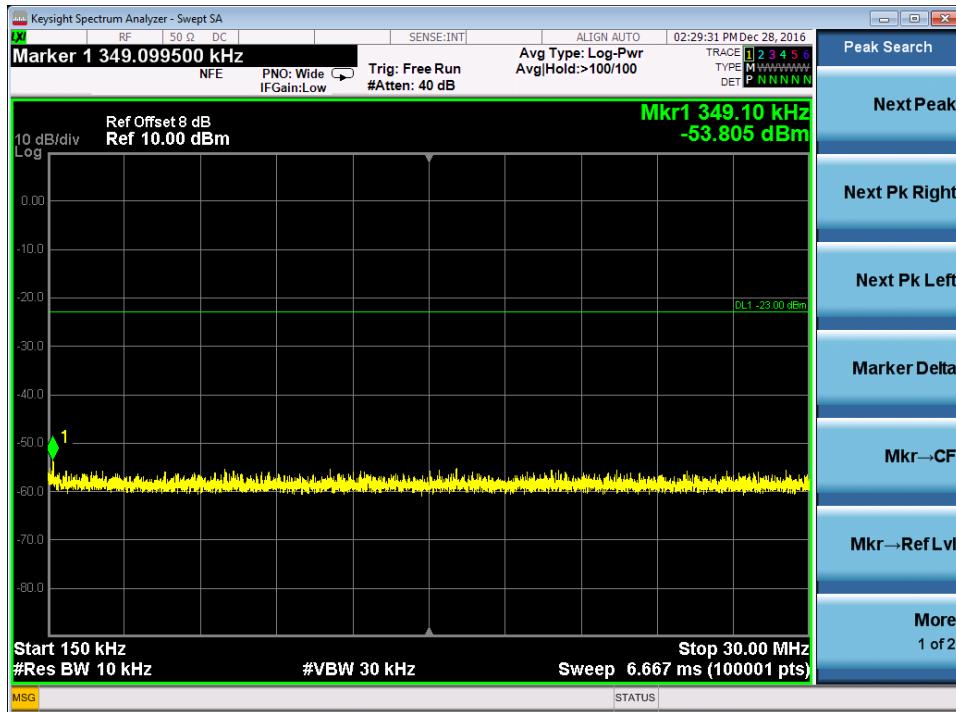


Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	High
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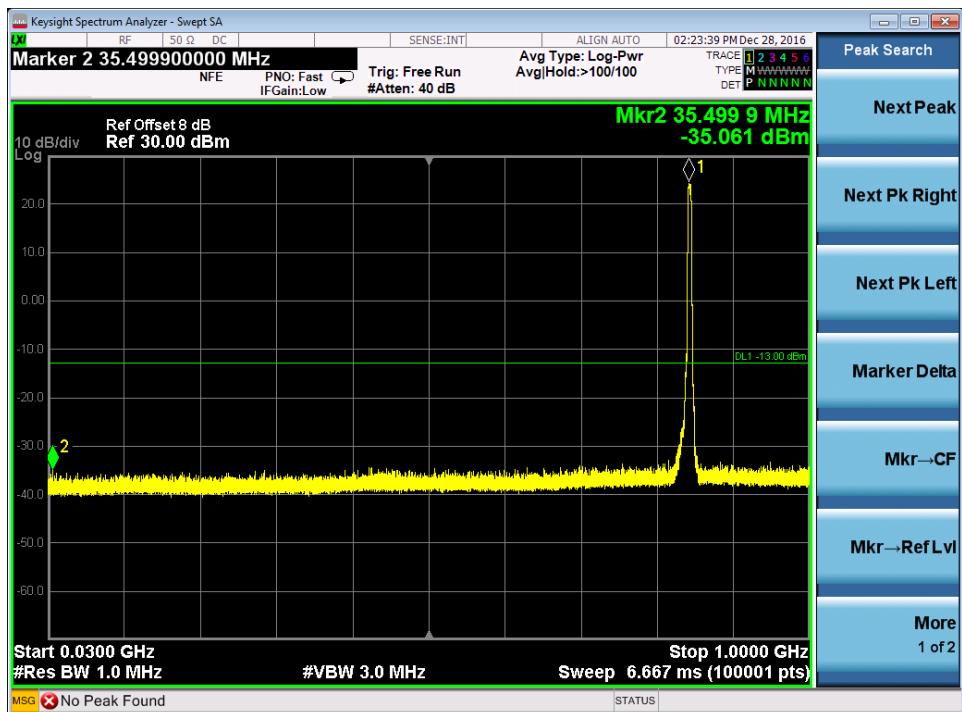
### 9KHz to 150KHz Test Plot



### 150KHz to 30MHz Test Plot



### 30MHz to 1GHz Test Plot



### 1GHz to 9GHz Test Plot



## 6.7 TRANSMITTER RADIATED POWER (EIRP/ERP)

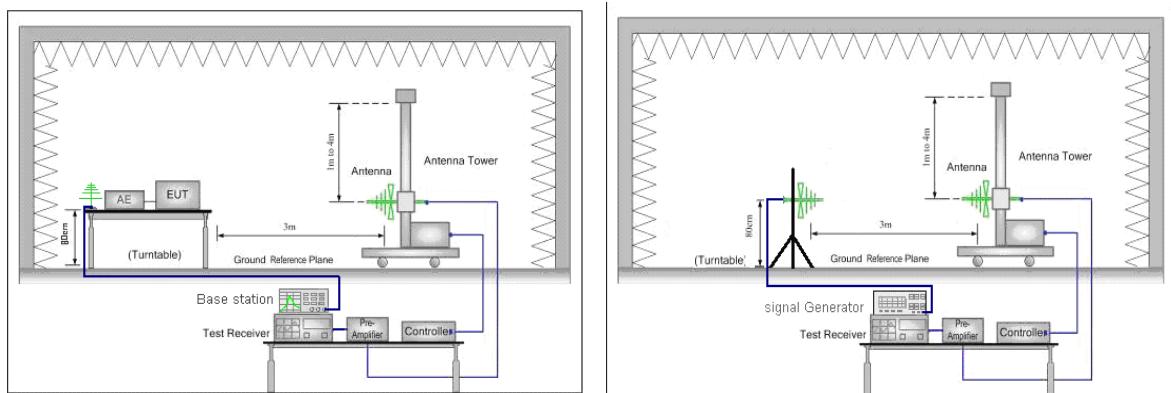
### REQUIREMENT

The Radiated Peak Output Power shall be according to the specific rule Part 22.913(a) that "Mobile/Portable station are limited to 7 watts e.r.p."

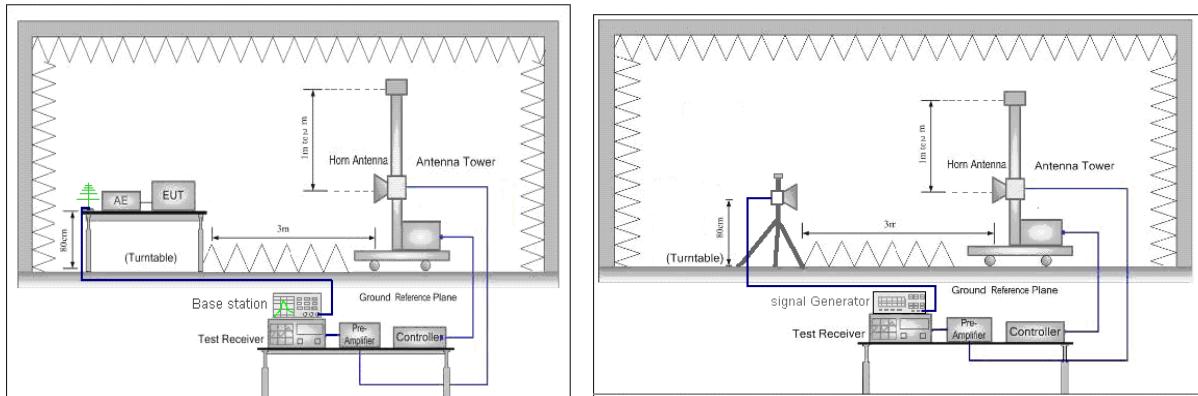
The Radiated Peak Output Power shall be according to the specific rule Part 24.232(b) that "Mobile/Portable station are limited to 2 watts e.i.r.p."

### TEST SETUP

Test Setup for Below 1G



Test Setup for Above 1G



## TEST PROCEDURES

Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 0.8m high table in a semi-anechoic chamber. The antenna of the transmitter was extended to its maximum length.
- 2). Adjust the settings of the Universal Radio Communication Tester to set the EUT to its maximum power at the required channel.
- 3). Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
- 4).The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 5).The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 6). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 4) is obtained for this set of conditions.
- 7).The output power into the substitution antenna was then measured.
- 8). Steps 5) and 6) were repeated with both antennas polarized.
- 9). Calculate power in dBm by the following formula:

$$\text{ERP (dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:

Pg is the generator output power into the substitution antenna.

- 10).Test the EUT in the low channel, the middle channel the High channel.
- 11). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 12). Repeat above procedures until all frequencies measured was complete.

Above 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 0.8m high table in a semi-anechoic chamber. The antenna of the transmitter was extended to its maximum length.
- 2). Adjust the settings of the Universal Radio Communication Tester to set the EUT to its maximum power at the required channel.
- 3). Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
- 4).The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 5).The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 6). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 4) is obtained for this set of conditions.
- 7).The output power into the substitution antenna was then measured.
- 8). Steps 5) and 6) were repeated with both antennas polarized.
- 9). Calculate power in dBm by the following formula:

$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:

Pg is the generator output power into the substitution antenna.

- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete.

**TEST RESULT**

GSM850MHz Test Result							
Test Mode	Channel	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(ERP) (dBm)
GSM/TM1	Low	30.96	Dipole	36.47	-4.90	0.6	30.97
GSM/TM1	Mid	30.89	Dipole	36.41	-5.02	0.6	30.79
GSM/TM1	High	30.95	Dipole	36.44	-5.00	0.6	30.84
GSM/TM2	Low	25.67	Dipole	31.37	-4.90	0.6	25.87
GSM/TM2	Mid	25.54	Dipole	31.08	-5.02	0.6	25.46
GSM/TM2	High	25.76	Dipole	31.48	-5.00	0.6	25.88

Note:

1: For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it,  $ERP [dBm] = SGP [dBm] - Cable\ Loss [dB] + Gain [dBd]$

2: SGP=Signal Generator Level

3: RBW > emission bandwidth, VBW > 3 x RBW. Detector: RMS

GSM1900MHz Test Result							
Test Mode	Channel	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(EIRP) / dBm
GSM/TM1	Low	29.23	Horn Ant.	25.77	4.50	1.0	29.27
GSM/TM1	Mid	29.42	Horn Ant.	25.91	4.50	1.0	29.41
GSM/TM1	High	29.68	Horn Ant.	26.12	4.50	1.0	29.62
GSM/TM2	Low	25.08	Horn Ant.	21.63	4.50	1.0	25.13
GSM/TM2	Mid	25.03	Horn Ant.	21.51	4.50	1.0	25.01
GSM/TM2	High	25.11	Horn Ant.	21.81	4.50	1.0	25.31

Note:

1: For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,  $EIRP [dBm] = SGP [dBm] - Cable\ Loss [dB] + Gain [dBd]$

2: SGP=Signal Generator Level

3: RBW > emission bandwidth, VBW > 3 x RBW. Detector: RMS

WCDMA Band II Test Result							
Test Mode	Channel	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(EIRP) (dBm)
UMTS/TM1	Low	23.06	Horn Ant.	19.75	4.50	1.0	23.25
UMTS/TM1	Mid	23.11	Horn Ant.	19.63	4.50	1.0	23.13
UMTS/TM1	High	23.15	Horn Ant.	19.62	4.50	1.0	23.12

Note:

- 1: For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,  $EIRP [dBm] = SGP [dBm] - \text{Cable Loss [dB]} + \text{Gain [dBd]}$
- 2: SGP=Signal Generator Level
- 3: RBW > emission bandwidth, VBW > 3 x RBW. Detector: RMS

WCDMA Band V Test Result							
Test Mode	Channel	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(ERP) / dBm
GSM/TM1	Low	23.09	Dipole	28.57	-4.90	0.6	23.07
GSM/TM1	Mid	23.07	Dipole	28.73	-5.02	0.6	23.11
GSM/TM1	High	23.01	Dipole	28.64	-5.00	0.6	23.04

Note:

- 1: For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it,  $ERP [dBm] = SGP [dBm] - \text{Cable Loss [dB]} + \text{Gain [dBd]}$
- 2: SGP=Signal Generator Level
- 3: RBW > emission bandwidth, VBW > 3 x RBW. Detector: RMS

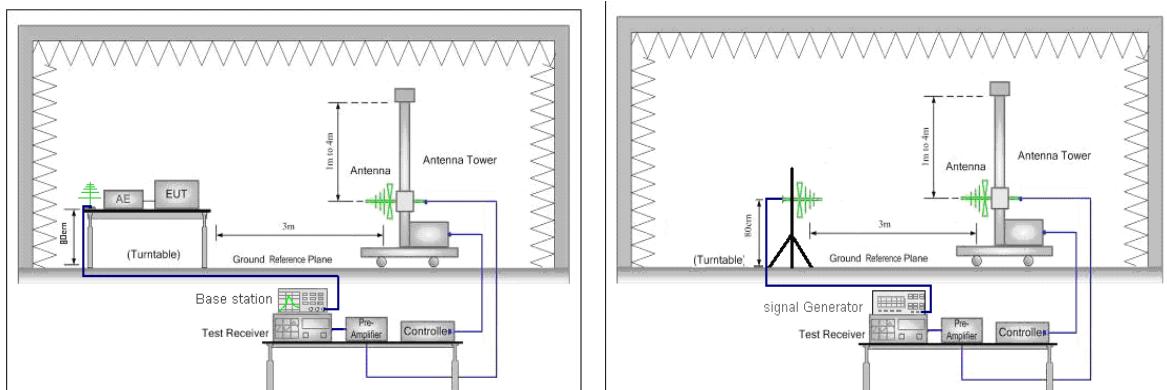
## 6.8 RADIATED OUT OF BAND EMISSIONS

### REQUIREMENT

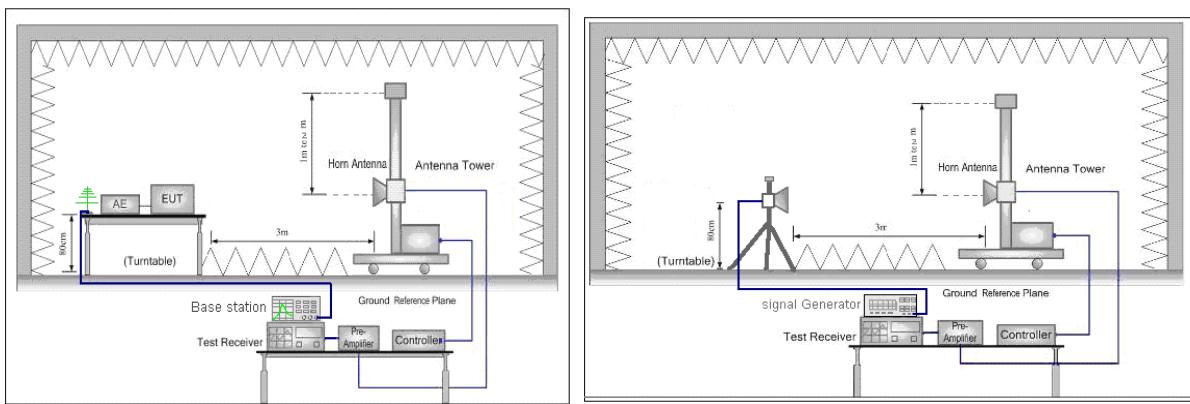
In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least  $43 + 10 \log_{10} p(\text{watts})$ .

### TEST SETUP

#### Test Setup for Below 1G



#### Test Setup for Above 1G



### **TEST PROCEDURES**

Below 1GHz test procedure as below:

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Calculate power in dBm by the following formula:

$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

Where:

P<sub>d</sub> is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB]. The calculated P<sub>d</sub> levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power [Watts]})$ .

Above 1GHz test procedure as below:

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Calculate power in dBm by the following formula:

$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:

Pg is the generator output power into the substitution antenna.

10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(\text{W}) - [43 + 10\log(P)] (\text{dB}) \\ &= [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB}) \\ &= -13\text{dBm}. \end{aligned}$$

Note:

1. Test the EUT in the low channel, the middle channel the High channel.
2. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.
3. The spectrum is measured from 9 KHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz and peak detector for above 1G.
4. For 9KHz to 30MHz: the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**TEST RESULT**

Band	GSM850MHz	Test Mode	GSM/TM1	Channel	Low
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
59.05	-50.72	-13.00	-37.72	Horizontal
104.36	-51.28	-13.00	-38.28	Horizontal
436.81	-39.82	-13.00	-26.82	Horizontal
614.84	-37.67	-13.00	-24.67	Horizontal
737.77	-35.14	-13.00	-22.14	Horizontal
997.72	-30.20	-13.00	-17.20	Horizontal
3846.12	-48.30	-13.00	-35.30	Horizontal
4796.69	-44.16	-13.00	-31.16	Horizontal
7219.57	-43.36	-13.00	-30.36	Horizontal
9033.21	-44.79	-13.00	-31.79	Horizontal
11163.51	-42.88	-13.00	-29.88	Horizontal
12315.32	-38.64	-13.00	-25.64	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
121.68	-49.14	-13.00	-36.14	Vertical
307.16	-49.75	-13.00	-36.75	Vertical
431.18	-43.55	-13.00	-30.55	Vertical
619.06	-38.47	-13.00	-25.47	Vertical
802.10	-37.33	-13.00	-24.33	Vertical
986.35	-33.00	-13.00	-20.00	Vertical
3957.22	-50.82	-13.00	-37.82	Vertical
4549.45	-48.93	-13.00	-35.93	Vertical
6326.55	-47.35	-13.00	-34.35	Vertical
7050.46	-39.14	-13.00	-26.14	Vertical
8018.54	-39.10	-13.00	-26.10	Vertical
12327.21	-41.20	-13.00	-28.20	Vertical

Band	GSM850MHz	Test Mode	GSM/TM1	Channel	Mid
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
44.55	-48.68	-13.00	-35.68	Horizontal
98.87	-48.88	-13.00	-35.88	Horizontal
431.58	-41.52	-13.00	-28.52	Horizontal
609.09	-37.08	-13.00	-24.08	Horizontal
718.70	-35.30	-13.00	-22.30	Horizontal
987.39	-31.95	-13.00	-18.95	Horizontal
3839.00	-47.28	-13.00	-34.28	Horizontal
4791.00	-46.06	-13.00	-33.06	Horizontal
7205.00	-40.77	-13.00	-27.77	Horizontal
9024.00	-41.95	-13.00	-28.95	Horizontal
11157.22	-41.54	-13.00	-28.54	Horizontal
12321.48	-40.05	-13.00	-27.05	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
105.66	-50.45	-13.00	-37.45	Vertical
300.63	-47.29	-13.00	-34.29	Vertical
412.18	-44.10	-13.00	-31.10	Vertical
605.21	-38.59	-13.00	-25.59	Vertical
788.54	-36.19	-13.00	-23.19	Vertical
976.72	-33.47	-13.00	-20.47	Vertical
3941.00	-48.66	-13.00	-35.66	Vertical
4536.00	-46.64	-13.00	-33.64	Vertical
6321.00	-44.61	-13.00	-31.61	Vertical
7035.00	-40.98	-13.00	-27.98	Vertical
8004.00	-41.13	-13.00	-28.13	Vertical
8990.00	-42.55	-13.00	-29.55	Vertical

Band	GSM850MHz	Test Mode	GSM/TM1	Channel	High
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
73.64	-51.71	-13.00	-38.71	Horizontal
122.82	-53.05	-13.00	-40.05	Horizontal
452.82	-38.63	-13.00	-25.63	Horizontal
633.35	-39.77	-13.00	-26.77	Horizontal
750.99	-34.26	-13.00	-21.26	Horizontal
1011.71	-32.91	-13.00	-19.91	Horizontal
3861.77	-49.17	-13.00	-36.17	Horizontal
4810.44	-47.03	-13.00	-34.03	Horizontal
7233.91	-45.98	-13.00	-32.98	Horizontal
9043.73	-45.54	-13.00	-32.54	Horizontal
8020.49	-39.42	-13.00	-26.42	Horizontal
8999.83	-45.05	-13.00	-32.05	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
139.12	-48.14	-13.00	-35.14	Vertical
321.55	-51.88	-13.00	-38.88	Vertical
443.84	-44.67	-13.00	-31.67	Vertical
628.07	-37.69	-13.00	-24.69	Vertical
808.75	-36.09	-13.00	-23.09	Vertical
1001.16	-34.53	-13.00	-21.53	Vertical
3966.41	-49.70	-13.00	-36.70	Vertical
4555.05	-48.43	-13.00	-35.43	Vertical
6340.99	-50.14	-13.00	-37.14	Vertical
7069.01	-40.59	-13.00	-27.59	Vertical
8028.30	-42.86	-13.00	-29.86	Vertical
12332.94	-39.14	-13.00	-26.14	Vertical

Band	GSM850MHz	Test Mode	GSM/TM2	Channel	Low
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
65.45	-53.52	-13.00	-40.52	Horizontal	
120.13	-53.30	-13.00	-40.30	Horizontal	
444.37	-41.27	-13.00	-28.27	Horizontal	
632.50	-37.29	-13.00	-24.29	Horizontal	
744.92	-36.24	-13.00	-23.24	Horizontal	
1009.15	-32.32	-13.00	-19.32	Horizontal	
3851.45	-48.65	-13.00	-35.65	Horizontal	
4802.26	-47.09	-13.00	-34.09	Horizontal	
7232.24	-45.57	-13.00	-32.57	Horizontal	
9041.53	-46.84	-13.00	-33.84	Horizontal	
11180.02	-45.04	-13.00	-32.04	Horizontal	
12333.34	-39.62	-13.00	-26.62	Horizontal	
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
146.54	-47.88	-13.00	-34.88	Vertical	
337.02	-54.78	-13.00	-41.78	Vertical	
450.73	-46.47	-13.00	-33.47	Vertical	
642.69	-38.04	-13.00	-25.04	Vertical	
825.96	-38.49	-13.00	-25.49	Vertical	
1017.06	-37.14	-13.00	-24.14	Vertical	
3975.03	-51.36	-13.00	-38.36	Vertical	
4566.01	-47.39	-13.00	-34.39	Vertical	
6360.38	-48.33	-13.00	-35.33	Vertical	
7082.20	-42.35	-13.00	-29.35	Vertical	
8046.67	-45.44	-13.00	-32.44	Vertical	
12352.34	-41.79	-13.00	-28.79	Vertical	

Band	GSM850MHz	Test Mode	GSM/TM2	Channel	Mid
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
67.87	-48.97	-13.00	-35.97	Horizontal	
114.27	-49.71	-13.00	-36.71	Horizontal	
446.97	-39.13	-13.00	-26.13	Horizontal	
633.35	-36.37	-13.00	-23.37	Horizontal	
742.80	-34.13	-13.00	-21.13	Horizontal	
1006.45	-29.02	-13.00	-16.02	Horizontal	
3854.16	-47.74	-13.00	-34.74	Horizontal	
4814.03	-46.97	-13.00	-33.97	Horizontal	
7229.00	-45.10	-13.00	-32.10	Horizontal	
9041.51	-46.33	-13.00	-33.33	Horizontal	
11171.91	-43.12	-13.00	-30.12	Horizontal	
12321.84	-39.66	-13.00	-26.66	Horizontal	
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
157.21	-51.11	-13.00	-38.11	Vertical	
327.82	-51.22	-13.00	-38.22	Vertical	
455.84	-44.26	-13.00	-31.26	Vertical	
640.34	-36.73	-13.00	-23.73	Vertical	
824.28	-35.94	-13.00	-22.94	Vertical	
1008.59	-34.87	-13.00	-21.87	Vertical	
3972.33	-52.06	-13.00	-39.06	Vertical	
4567.32	-51.18	-13.00	-38.18	Vertical	
6350.78	-52.12	-13.00	-39.12	Vertical	
7084.17	-40.41	-13.00	-27.41	Vertical	
8037.29	-45.11	-13.00	-32.11	Vertical	
12343.83	-40.25	-13.00	-27.25	Vertical	

Band	GSM850MHz	Test Mode	GSM/TM2	Channel	High
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
70.48	-50.81	-13.00	-37.81	Horizontal	
119.77	-49.58	-13.00	-36.58	Horizontal	
443.77	-41.72	-13.00	-28.72	Horizontal	
626.37	-39.84	-13.00	-26.84	Horizontal	
746.01	-35.36	-13.00	-22.36	Horizontal	
1006.85	-30.88	-13.00	-17.88	Horizontal	
3853.73	-46.79	-13.00	-33.79	Horizontal	
4802.44	-44.07	-13.00	-31.07	Horizontal	
7232.54	-44.01	-13.00	-31.01	Horizontal	
9040.90	-47.09	-13.00	-34.09	Horizontal	
11183.16	-41.45	-13.00	-28.45	Horizontal	
12332.49	-40.23	-13.00	-27.23	Horizontal	
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	
155.46	-49.25	-13.00	-36.25	Vertical	
331.47	-50.41	-13.00	-37.41	Vertical	
451.97	-46.38	-13.00	-33.38	Vertical	
639.31	-37.47	-13.00	-24.47	Vertical	
827.15	-36.49	-13.00	-23.49	Vertical	
1017.47	-32.78	-13.00	-19.78	Vertical	
3976.50	-48.10	-13.00	-35.10	Vertical	
4572.98	-51.17	-13.00	-38.17	Vertical	
6349.30	-49.51	-13.00	-36.51	Vertical	
7076.78	-40.14	-13.00	-27.14	Vertical	
8044.15	-41.65	-13.00	-28.65	Vertical	
12348.71	-38.43	-13.00	-25.43	Vertical	

Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	Low
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
100.69	-42.54	-13.00	-29.54	Horizontal
293.56	-40.12	-13.00	-27.12	Horizontal
358.34	-38.95	-13.00	-25.95	Horizontal
621.92	-31.42	-13.00	-18.42	Horizontal
860.75	-27.75	-13.00	-14.75	Horizontal
975.57	-25.88	-13.00	-12.88	Horizontal
2937.60	-42.56	-13.00	-29.56	Horizontal
5650.98	-42.01	-13.00	-29.01	Horizontal
7133.50	-38.91	-13.00	-25.91	Horizontal
14023.11	-33.09	-13.00	-20.09	Horizontal
15665.36	-29.49	-13.00	-16.49	Horizontal
17215.45	-28.68	-13.00	-15.68	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
41.86	-42.50	-13.00	-29.50	Vertical
114.62	-46.28	-13.00	-33.28	Vertical
408.62	-38.91	-13.00	-25.91	Vertical
654.26	-33.66	-13.00	-20.66	Vertical
844.91	-27.40	-13.00	-14.40	Vertical
941.38	-28.86	-13.00	-15.86	Vertical
2926.63	-47.49	-13.00	-34.49	Vertical
4793.35	-46.88	-13.00	-33.88	Vertical
7127.87	-39.28	-13.00	-26.28	Vertical
8913.11	-40.06	-13.00	-27.06	Vertical
14068.06	-33.32	-13.00	-20.32	Vertical
16348.39	-27.16	-13.00	-14.16	Vertical

Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	Mid
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
94.02	-44.04	-13.00	-31.04	Horizontal
288.02	-40.64	-13.00	-27.64	Horizontal
342.34	-39.78	-13.00	-26.78	Horizontal
606.18	-31.51	-13.00	-18.51	Horizontal
850.62	-29.03	-13.00	-16.03	Horizontal
957.32	-27.68	-13.00	-14.68	Horizontal
2921.00	-44.04	-13.00	-31.04	Horizontal
5641.00	-43.94	-13.00	-30.94	Horizontal
7120.00	-40.83	-13.00	-27.83	Horizontal
14005.00	-33.32	-13.00	-20.32	Horizontal
15654.00	-30.39	-13.00	-17.39	Horizontal
17201.00	-29.25	-13.00	-16.25	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
36.79	-43.52	-13.00	-30.52	Vertical
102.75	-43.81	-13.00	-30.81	Vertical
401.51	-37.30	-13.00	-24.30	Vertical
640.13	-31.27	-13.00	-18.27	Vertical
829.28	-29.15	-13.00	-16.15	Vertical
930.16	-27.85	-13.00	-14.85	Vertical
2921.00	-49.44	-13.00	-36.44	Vertical
4774.00	-47.17	-13.00	-34.17	Vertical
7120.00	-40.35	-13.00	-27.35	Vertical
8905.00	-41.94	-13.00	-28.94	Vertical
14056.00	-33.08	-13.00	-20.08	Vertical
16334.00	-28.77	-13.00	-15.77	Vertical

Band	GSM1900MHz	Test Mode	GSM/TM1	Channel	High
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
111.89	-43.70	-13.00	-30.70	Horizontal
299.94	-40.26	-13.00	-27.26	Horizontal
374.54	-37.39	-13.00	-24.39	Horizontal
632.61	-34.26	-13.00	-21.26	Horizontal
876.94	-27.52	-13.00	-14.52	Horizontal
985.24	-24.24	-13.00	-11.24	Horizontal
2955.78	-43.93	-13.00	-30.93	Horizontal
5657.59	-40.02	-13.00	-27.02	Horizontal
7143.41	-39.93	-13.00	-26.93	Horizontal
14033.01	-35.30	-13.00	-22.30	Horizontal
15680.44	-28.63	-13.00	-15.63	Horizontal
17234.81	-29.78	-13.00	-16.78	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
46.90	-43.01	-13.00	-30.01	Vertical
124.49	-48.48	-13.00	-35.48	Vertical
418.29	-40.48	-13.00	-27.48	Vertical
669.35	-36.13	-13.00	-23.13	Vertical
850.18	-27.04	-13.00	-14.04	Vertical
946.43	-26.87	-13.00	-13.87	Vertical
2944.10	-47.81	-13.00	-34.81	Vertical
4801.86	-49.42	-13.00	-36.42	Vertical
7142.42	-41.57	-13.00	-28.57	Vertical
8932.61	-41.12	-13.00	-28.12	Vertical
14086.99	-33.45	-13.00	-20.45	Vertical
16360.85	-26.66	-13.00	-13.66	Vertical

Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	Low
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
115.14	-44.13	-13.00	-31.13	Horizontal
301.42	-41.92	-13.00	-28.92	Horizontal
377.77	-37.46	-13.00	-24.46	Horizontal
628.43	-30.29	-13.00	-17.29	Horizontal
876.92	-30.53	-13.00	-17.53	Horizontal
985.07	-27.35	-13.00	-14.35	Horizontal
2956.16	-44.94	-13.00	-31.94	Horizontal
5663.91	-44.05	-13.00	-31.05	Horizontal
7147.85	-38.40	-13.00	-25.40	Horizontal
14036.26	-34.06	-13.00	-21.06	Horizontal
15673.13	-28.52	-13.00	-15.52	Horizontal
17230.15	-29.48	-13.00	-16.48	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
53.05	-43.07	-13.00	-30.07	Vertical
132.20	-49.20	-13.00	-36.20	Vertical
430.79	-42.47	-13.00	-29.47	Vertical
681.24	-36.37	-13.00	-23.37	Vertical
868.63	-26.84	-13.00	-13.84	Vertical
963.83	-25.02	-13.00	-12.02	Vertical
2956.94	-49.03	-13.00	-36.03	Vertical
4817.15	-50.17	-13.00	-37.17	Vertical
7156.63	-41.79	-13.00	-28.79	Vertical
8949.82	-43.75	-13.00	-30.75	Vertical
14099.18	-32.13	-13.00	-19.13	Vertical
16367.08	-26.96	-13.00	-13.96	Vertical

Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	Mid
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
108.82	-44.21	-13.00	-31.21	Horizontal
309.38	-39.13	-13.00	-26.13	Horizontal
370.49	-37.44	-13.00	-24.44	Horizontal
629.85	-30.61	-13.00	-17.61	Horizontal
868.05	-27.65	-13.00	-14.65	Horizontal
991.26	-25.57	-13.00	-12.57	Horizontal
2955.27	-43.48	-13.00	-30.48	Horizontal
5663.56	-41.01	-13.00	-28.01	Horizontal
7152.33	-40.08	-13.00	-27.08	Horizontal
14028.83	-34.02	-13.00	-21.02	Horizontal
15684.80	-29.50	-13.00	-16.50	Horizontal
17233.21	-29.22	-13.00	-16.22	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
54.45	-42.29	-13.00	-29.29	Vertical
142.22	-48.45	-13.00	-35.45	Vertical
432.92	-38.84	-13.00	-25.84	Vertical
689.00	-38.49	-13.00	-25.49	Vertical
855.27	-28.78	-13.00	-15.78	Vertical
959.21	-27.61	-13.00	-14.61	Vertical
2963.09	-46.73	-13.00	-33.73	Vertical
4808.00	-47.91	-13.00	-34.91	Vertical
7156.78	-42.49	-13.00	-29.49	Vertical
8950.69	-39.37	-13.00	-26.37	Vertical
14096.69	-32.08	-13.00	-19.08	Vertical
16369.02	-25.34	-13.00	-12.34	Vertical

Band	GSM1900MHz	Test Mode	GSM/TM2	Channel	High
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
122.72	-43.46	-13.00	-30.46	Horizontal
310.20	-42.24	-13.00	-29.24	Horizontal
388.87	-36.40	-13.00	-23.40	Horizontal
646.54	-32.30	-13.00	-19.30	Horizontal
894.94	-30.27	-13.00	-17.27	Horizontal
996.46	-22.48	-13.00	-9.48	Horizontal
2967.80	-42.53	-13.00	-29.53	Horizontal
5675.25	-41.49	-13.00	-28.49	Horizontal
7154.31	-42.57	-13.00	-29.57	Horizontal
14049.30	-38.07	-13.00	-25.07	Horizontal
15688.56	-31.04	-13.00	-18.04	Horizontal
17249.15	-29.61	-13.00	-16.61	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
66.48	-45.75	-13.00	-32.75	Vertical
129.62	-48.10	-13.00	-35.10	Vertical
437.54	-39.40	-13.00	-26.40	Vertical
680.89	-36.95	-13.00	-23.95	Vertical
866.44	-30.01	-13.00	-17.01	Vertical
963.48	-27.40	-13.00	-14.40	Vertical
2950.64	-47.10	-13.00	-34.10	Vertical
4811.45	-49.15	-13.00	-36.15	Vertical
7156.21	-44.36	-13.00	-31.36	Vertical
8938.55	-44.06	-13.00	-31.06	Vertical
14103.41	-33.49	-13.00	-20.49	Vertical
16365.98	-26.16	-13.00	-13.16	Vertical

Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Low
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
117.77	-42.02	-13.00	-29.02	Horizontal
288.17	-41.50	-13.00	-28.50	Horizontal
628.43	-32.24	-13.00	-19.24	Horizontal
734.47	-31.67	-13.00	-18.67	Horizontal
879.83	-29.50	-13.00	-16.50	Horizontal
968.44	-29.28	-13.00	-16.28	Horizontal
2931.70	-49.09	-13.00	-36.09	Horizontal
5654.57	-45.52	-13.00	-32.52	Horizontal
7126.30	-40.58	-13.00	-27.58	Horizontal
14018.65	-34.80	-13.00	-21.80	Horizontal
15659.50	-30.74	-13.00	-17.74	Horizontal
17218.35	-29.30	-13.00	-16.30	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
127.46	-44.32	-13.00	-31.32	Vertical
340.90	-39.77	-13.00	-26.77	Vertical
406.53	-35.71	-13.00	-22.71	Vertical
633.46	-32.76	-13.00	-19.76	Vertical
741.55	-31.06	-13.00	-18.06	Vertical
966.54	-25.45	-13.00	-12.45	Vertical
2929.66	-50.01	-13.00	-37.01	Vertical
4780.45	-47.48	-13.00	-34.48	Vertical
7127.63	-39.83	-13.00	-26.83	Vertical
8914.06	-43.35	-13.00	-30.35	Vertical
14061.32	-33.21	-13.00	-20.21	Vertical
16348.24	-28.93	-13.00	-15.93	Vertical

Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	Mid
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
98.87	-44.01	-13.00	-31.01	Horizontal
276.38	-42.00	-13.00	-29.00	Horizontal
613.94	-31.00	-13.00	-18.00	Horizontal
722.58	-30.34	-13.00	-17.34	Horizontal
867.11	-28.88	-13.00	-15.88	Horizontal
955.38	-27.03	-13.00	-14.03	Horizontal
2921.00	-48.08	-13.00	-35.08	Horizontal
5641.00	-43.94	-13.00	-30.94	Horizontal
7120.00	-40.83	-13.00	-27.83	Horizontal
14005.00	-33.32	-13.00	-20.32	Horizontal
15654.00	-30.39	-13.00	-17.39	Horizontal
17201.00	-29.25	-13.00	-16.25	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
114.39	-43.68	-13.00	-30.68	Vertical
335.55	-40.53	-13.00	-27.53	Vertical
395.69	-37.62	-13.00	-24.62	Vertical
613.94	-31.00	-13.00	-18.00	Vertical
722.58	-30.34	-13.00	-17.34	Vertical
953.44	-27.02	-13.00	-14.02	Vertical
2921.00	-49.44	-13.00	-36.44	Vertical
4774.00	-47.17	-13.00	-34.17	Vertical
7120.00	-40.35	-13.00	-27.35	Vertical
8905.00	-41.94	-13.00	-28.94	Vertical
14056.00	-33.08	-13.00	-20.08	Vertical
16334.00	-28.77	-13.00	-15.77	Vertical

Band	WCDMA Band II	Test Mode	UMTS/TM1	Channel	High
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
112.73	-45.12	-13.00	-32.12	Horizontal
288.20	-41.77	-13.00	-28.77	Horizontal
628.51	-32.25	-13.00	-19.25	Horizontal
733.41	-31.02	-13.00	-18.02	Horizontal
878.37	-29.41	-13.00	-16.41	Horizontal
962.31	-28.18	-13.00	-15.18	Horizontal
2933.67	-47.96	-13.00	-34.96	Horizontal
5649.10	-42.04	-13.00	-29.04	Horizontal
7132.75	-41.86	-13.00	-28.86	Horizontal
14015.58	-34.23	-13.00	-21.23	Horizontal
15668.01	-32.76	-13.00	-19.76	Horizontal
17206.03	-30.66	-13.00	-17.66	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
121.18	-44.30	-13.00	-31.30	Vertical
345.29	-39.36	-13.00	-26.36	Vertical
412.54	-40.50	-13.00	-27.50	Vertical
626.76	-30.02	-13.00	-17.02	Vertical
741.17	-30.95	-13.00	-17.95	Vertical
966.09	-25.96	-13.00	-12.96	Vertical
2939.35	-50.07	-13.00	-37.07	Vertical
4779.02	-47.57	-13.00	-34.57	Vertical
7132.68	-40.21	-13.00	-27.21	Vertical
8918.55	-42.49	-13.00	-29.49	Vertical
14064.50	-35.39	-13.00	-22.39	Vertical
16343.80	-27.82	-13.00	-14.82	Vertical

Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Low
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
67.84	-46.36	-13.00	-33.36	Horizontal
111.88	-41.90	-13.00	-28.90	Horizontal
437.38	-36.15	-13.00	-23.15	Horizontal
595.65	-32.30	-13.00	-19.30	Horizontal
693.07	-28.94	-13.00	-15.94	Horizontal
1002.69	-27.25	-13.00	-14.25	Horizontal
3900.19	-46.22	-13.00	-33.22	Horizontal
5488.27	-47.70	-13.00	-34.70	Horizontal
6285.85	-41.50	-13.00	-28.50	Horizontal
7189.43	-43.74	-13.00	-30.74	Horizontal
7947.51	-42.33	-13.00	-29.33	Horizontal
8730.80	-40.78	-13.00	-27.78	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
117.78	-42.29	-13.00	-29.29	Vertical
302.70	-41.38	-13.00	-28.38	Vertical
492.98	-34.71	-13.00	-21.71	Vertical
641.28	-32.07	-13.00	-19.07	Vertical
704.77	-28.99	-13.00	-15.99	Vertical
972.70	-26.23	-13.00	-13.23	Vertical
3052.05	-46.98	-13.00	-33.98	Vertical
4747.26	-45.03	-13.00	-32.03	Vertical
6625.91	-44.82	-13.00	-31.82	Vertical
6965.41	-42.02	-13.00	-29.02	Vertical
7930.04	-40.95	-13.00	-27.95	Vertical
9001.27	-41.52	-13.00	-28.52	Vertical

Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	Mid
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
50.37	-43.50	-13.00	-30.50	Horizontal
97.90	-43.75	-13.00	-30.75	Horizontal
427.70	-37.16	-13.00	-24.16	Horizontal
584.84	-33.41	-13.00	-20.41	Horizontal
683.78	-30.26	-13.00	-17.26	Horizontal
993.21	-26.80	-13.00	-13.80	Horizontal
3890.00	-47.26	-13.00	-34.26	Horizontal
5471.00	-46.16	-13.00	-33.16	Horizontal
6270.00	-43.44	-13.00	-30.44	Horizontal
7171.00	-40.93	-13.00	-27.93	Horizontal
7936.00	-40.38	-13.00	-27.38	Horizontal
8718.00	-42.37	-13.00	-29.37	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
99.84	-43.50	-13.00	-30.50	Vertical
296.75	-40.59	-13.00	-27.59	Vertical
480.08	-36.52	-13.00	-23.52	Vertical
625.58	-31.13	-13.00	-18.13	Vertical
699.30	-30.38	-13.00	-17.38	Vertical
962.17	-26.68	-13.00	-13.68	Vertical
3040.00	-48.92	-13.00	-35.92	Vertical
4740.00	-46.89	-13.00	-33.89	Vertical
6610.00	-43.32	-13.00	-30.32	Vertical
6950.00	-41.68	-13.00	-28.68	Vertical
7919.00	-40.16	-13.00	-27.16	Vertical
8990.00	-42.96	-13.00	-29.96	Vertical

Band	WCDMA Band V	Test Mode	UMTS/TM1	Channel	High
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Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
64.69	-41.84	-13.00	-28.84	Horizontal
111.51	-45.75	-13.00	-32.75	Horizontal
440.40	-38.91	-13.00	-25.91	Horizontal
599.42	-31.77	-13.00	-18.77	Horizontal
701.04	-29.72	-13.00	-16.72	Horizontal
1009.54	-25.71	-13.00	-12.71	Horizontal
3902.43	-47.63	-13.00	-34.63	Horizontal
5486.82	-47.63	-13.00	-34.63	Horizontal
6278.85	-42.59	-13.00	-29.59	Horizontal
7185.57	-41.05	-13.00	-28.05	Horizontal
7947.90	-41.77	-13.00	-28.77	Horizontal
8725.19	-41.18	-13.00	-28.18	Horizontal

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
109.01	-42.87	-13.00	-29.87	Vertical
314.47	-40.48	-13.00	-27.48	Vertical
490.03	-35.18	-13.00	-22.18	Vertical
632.37	-31.62	-13.00	-18.62	Vertical
712.41	-32.00	-13.00	-19.00	Vertical
981.32	-28.05	-13.00	-15.05	Vertical
3054.03	-48.03	-13.00	-35.03	Vertical
4755.19	-49.35	-13.00	-36.35	Vertical
6622.36	-41.79	-13.00	-28.79	Vertical
6965.68	-40.15	-13.00	-27.15	Vertical
7932.26	-41.74	-13.00	-28.74	Vertical
9008.03	-41.97	-13.00	-28.97	Vertical

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