

Test Mode:	GPRS 1900	Test channel :	661
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Agilent Spectrum Analyzer - Swept SA

Marker 1 9.000000 kHz

Ref Offset 10.7 dB
Ref 20.70 dBm

Mkr1 9.000 kHz
-50.045 dBm

Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Sweep 134.8 ms (1001 pts)

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr--CF

Mkr--Ref Lvl

More
1 of 2

9KHz~150KHz

Agilent Spectrum Analyzer - Swept SA

Marker 1 169.700000 kHz

Ref Offset 10.7 dB
Ref 40.70 dBm

Mkr1 169.70 kHz
-42.347 dBm

Start 150 kHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 94.20 ms (1001 pts)

Trace/Detector

Select Trace
1

Clear Write

Trace Average

Max Hold

Min Hold

View Blank
Trace On

More
1 of 3

150KHz-10MHz

Agilent Spectrum Analyzer - Swept SA

Marker 1 23.28000000 MHz

Ref Offset 10.7 dB
Ref 40.70 dBm

Mkr1 23.28 MHz
-30.336 dBm

Start 10.00 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 1.000 ms (1001 pts)

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

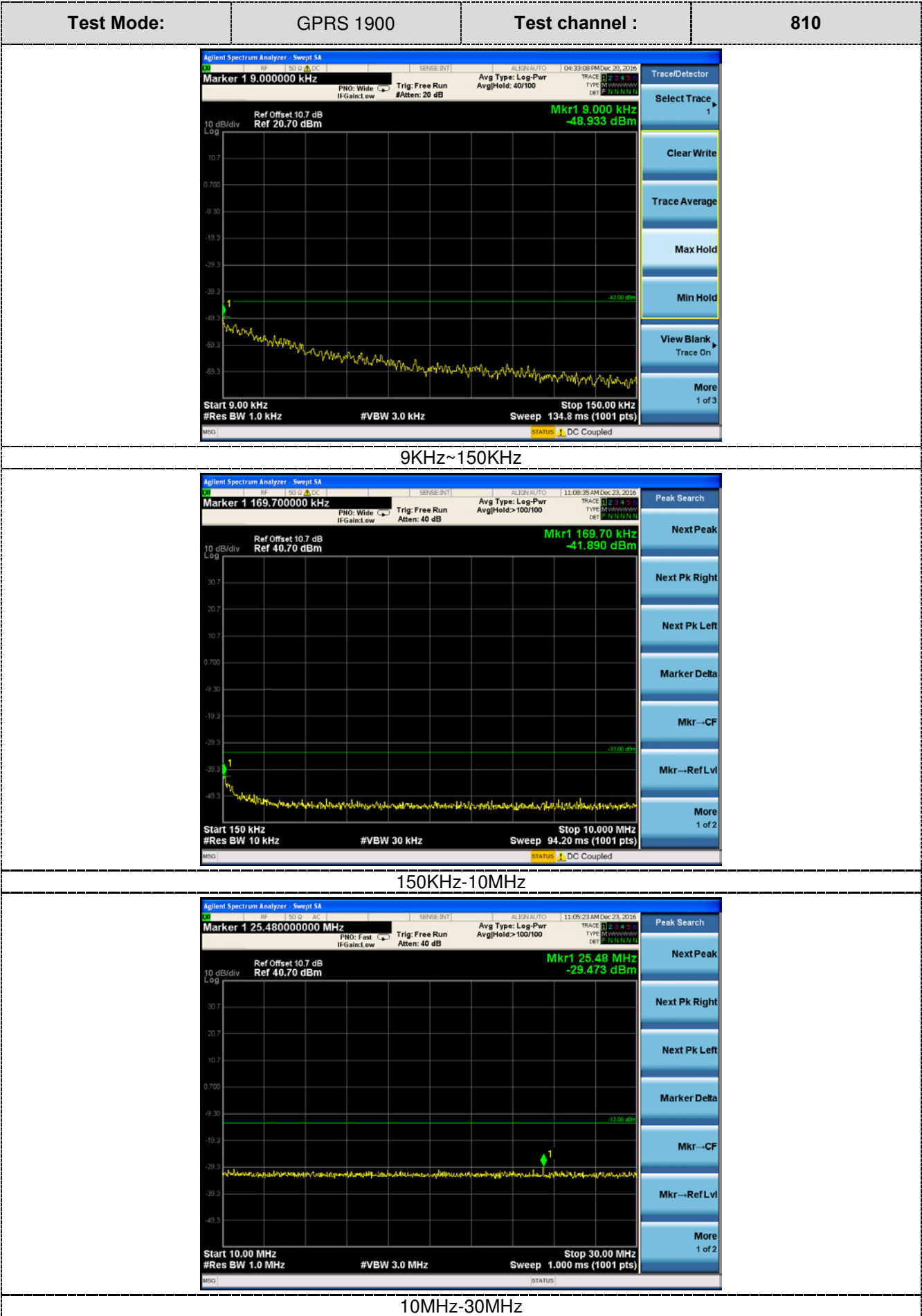
Mkr--CF

Mkr--Ref Lvl

More
1 of 2

10MHz-30MHz

Test Mode:	GPRS 1900	Test channel :	661
Agilent Spectrum Analyzer - Swept SA Marker 1 2.670330000000 GHz Ref Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 3.000 GHz Sweep 2.867 ms (1001 pts) MDG STATUS SENSE:INT ALIGN:AUTO 04:30:45 PM Dec 20, 2016 Trig: Free Run Avg Type: Log-Pwr Avg Hold: 100/100 TRACE 1 2 3 4 5 6 TYPE: SWEPT DEF: N N N N N N Mkr1 2.670 3 GHz -26.404 dBm -13.00 dBm 1 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2			
30MHz-3GHz			
Agilent Spectrum Analyzer - Swept SA Marker 1 5.814000000000 GHz Ref Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 3.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 9.000 GHz Sweep 10.00 ms (1001 pts) MDG STATUS SENSE:INT ALIGN:AUTO 04:30:13 PM Dec 20, 2016 Trig: Free Run Avg Type: Log-Pwr Avg Hold: 36/100 TRACE 1 2 3 4 5 6 TYPE: SWEPT DEF: N N N N N N Mkr1 5.814 GHz -26.026 dBm -13.00 dBm 1 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2			
3GHz-9GHz			
Agilent Spectrum Analyzer - Swept SA Marker 1 19.593000000000 GHz Ref Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 20.000 GHz Sweep 27.53 ms (1001 pts) MDG STATUS SENSE:INT ALIGN:AUTO 11:23:59 AM Dec 23, 2016 Trig: Free Run Avg Type: Log-Pwr Avg Hold: 28/100 TRACE 1 2 3 4 5 6 TYPE: SWEPT DEF: N N N N N N Mkr1 19.593 GHz -21.939 dBm -13.00 dBm 1 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2			
9GHz-20GHz			



Test Mode:	GPRS 1900	Test channel :	810								
Agilent Spectrum Analyzer - Swept SA Marker 1 2.750520000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 2.867 ms (1001 pts) Mkr1 2.750 5 GHz -25.516 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 100/100 PRN: Fast IF Gain: Low #Atten: 40 dB 04:29:04 PM Dec 20, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 30MHz-3GHz <tr><td colspan="4"> Agilent Spectrum Analyzer - Swept SA Marker 1 5.886000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 3.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (1001 pts) Mkr1 5.886 GHz -26.312 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 39/100 PRN: Fast IF Gain: Low #Atten: 40 dB 04:29:47 PM Dec 20, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 3GHz-9GHz <tr><td colspan="4"> Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz </td></tr></td></tr>				Agilent Spectrum Analyzer - Swept SA Marker 1 5.886000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 3.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (1001 pts) Mkr1 5.886 GHz -26.312 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 39/100 PRN: Fast IF Gain: Low #Atten: 40 dB 04:29:47 PM Dec 20, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 3GHz-9GHz <tr><td colspan="4"> Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz </td></tr>				Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz			
Agilent Spectrum Analyzer - Swept SA Marker 1 5.886000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 3.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (1001 pts) Mkr1 5.886 GHz -26.312 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 39/100 PRN: Fast IF Gain: Low #Atten: 40 dB 04:29:47 PM Dec 20, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 3GHz-9GHz <tr><td colspan="4"> Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz </td></tr>				Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz							
Agilent Spectrum Analyzer - Swept SA Marker 1 19.780000000000 GHz RF Offset 10.7 dB Ref 40.00 dBm 10 dB/div Log 30.0 20.0 10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0 Start 9.000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 27.53 ms (1001 pts) Mkr1 19.780 GHz -22.473 dBm Trig: Free Run Avg Type: Log-Pwr AvgHold: 27/100 PRN: Fast IF Gain: Low #Atten: 40 dB 11:24:25 AM Dec 23, 2016 TRACE 1 2 3 4 5 6 TYPE 2 2 2 2 2 2 2 DET 2 2 2 2 2 2 2 Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr--CF Mkr--Ref Lvl More 1 of 2 9GHz-20GHz											

4.6 Frequency Stability Test

TEST APPLICABLE

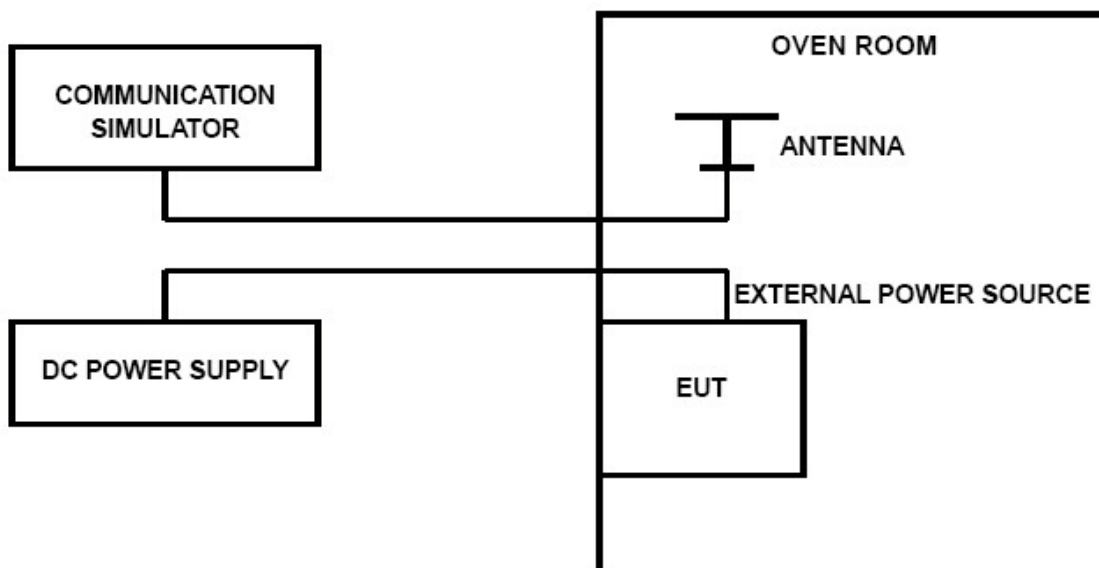
1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +50°C centigrade.
2. According to FCC Part 2 Section 2.1055 (E) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried voltage equipment and the end voltage point was 3.4V.

TEST PROCEDURE

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature;
2. Subject the EUT to overnight soak at -30°C;
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel of PCS 1900 and GSM850, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming;
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 0.5 hours at each temperature, unpowered, before making measurements;
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 0.5 hours unpowered, to allow any self-heating to stabilize, before continuing;
6. Subject the EUT to overnight soak at +50°C;
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming;
8. Repeat the above measurements at 10°C increments from +50°C to -30°C. Allow at least 0.5 hours at each temperature, unpowered, before making measurements;
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure;

TEST CONFIGURATION



TEST LIMITS***For Hand carried battery powered equipment***

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 10.8VDC and 13.2VDC, with a nominal voltage of 12 DC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

TEST RESULTS

GPRS 850 Middle channel=190 channel=836.6MHz					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
3.4	25	26	0.0311	2.50	PASS
3.8	25	21	0.0251	2.50	PASS
4.2	25	23	0.0275	2.50	PASS
3.8	-30	19	0.0227	2.50	PASS
3.8	-20	27	0.0323	2.50	PASS
3.8	-10	23	0.0275	2.50	PASS
3.8	0	22	0.0263	2.50	PASS
3.8	10	18	0.0215	2.50	PASS
3.8	20	20	0.0239	2.50	PASS
3.8	30	18	0.0215	2.50	PASS
3.8	40	17	0.0203	2.50	PASS
3.8	50	21	0.0251	2.50	PASS

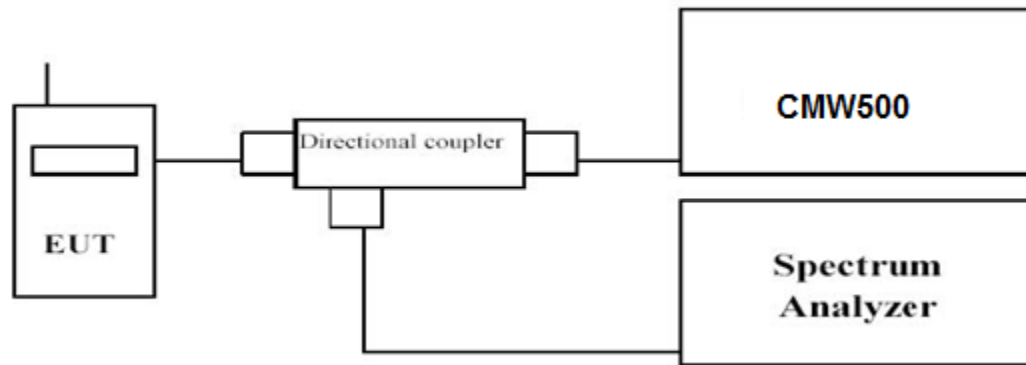
GPRS 1900 Middle channel=661 channel=1880MHz					
DC Power	Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
3.4	25	35	0.0186	2.50	PASS
3.8	25	31	0.0165	2.50	PASS
4.2	25	34	0.0181	2.50	PASS
3.8	-30	30	0.0160	2.50	PASS
3.8	-20	33	0.0176	2.50	PASS
3.8	-10	37	0.0197	2.50	PASS
3.8	0	32	0.0170	2.50	PASS
3.8	10	38	0.0202	2.50	PASS
3.8	20	35	0.0186	2.50	PASS
3.8	30	31	0.0165	2.50	PASS
3.8	40	32	0.0170	2.50	PASS
3.8	50	30	0.0160	2.50	PASS

4.7 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

Use spectrum to measure the total peak power and record as P_{Pk} . Use spectrum to measure the total average power and record as P_{Avg} . Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm).

Determine the PAPR from:

$$PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).$$

TEST RESULTS

GPRS 850	
Frequency (MHz)	Measured (dB)
824.20	0.53
836.60	0.14
848.80	0.82

GPRS 1900	
Frequency (MHz)	Measured (dB)
1850.20	0.67
1880.00	0.72
1909.80	0.45



Agilent Spectrum Analyzer - Power Stat CDF

MSG	REF	LOCK	ACQ	SOURCE INTI	ALIGN AUTO	D4-14-40 PM Dec 23, 2016
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Center Freq 1.850200000 GHz Center Freq: 1.850200000 GHz Radio Std: None
 Trig: Free Run Counts: 8.42 M/10.0 Mpt
 #F-Gain: low #Att: 40 dB

Average Power

19.09 dBm

11.14 % at 0dB

10.0 %	9.51 dB
1.0 %	9.64 dB
0.1 %	9.67 dB
0.01 %	9.68 dB
0.001 %	9.69 dB
0.0001 %	9.69 dB
Peak	17.49 dB
	36.58 dBm

Gaussian

Info BW 5.0000 MHz

Frequency

Center Freq
1.850200000 GHz

CF Step
5.000000 MHz
Auto Man

Freq Offset
0 Hz

MSG STATUS

Agilent Spectrum Analyzer Power Stat CDF

MODE: BW: 5.000 MHz

Center Freq: 1.880000000 GHz

Trig: Free Run

Counts: 2.34 M/10.0 Mpt

Radio Std: None

#F Gain: low

#Att: 40 dB

Average Power

19.17 dBm

11.04 % at 0dB

10.0 % 9.54 dB

1.0 % 9.68 dB

0.1 % 9.72 dB

0.01 % 9.73 dB

0.001 % 9.74 dB

0.0001 % 9.74 dB

Peak 10.60 dB

29.77 dBm

Gaussian

0 dB 20 dB

Info BW 5.0000 MHz

Frequency

Center Freq: 1.880000000 GHz

CF Step: 5.000000 MHz

Auto

Freq Offset: 0 Hz

Agilent Spectrum Analyzer - Power Stat CDF

SENSE INT1 ALIGN AUTO 04:19:40 PM Dec 23, 2016

Center Freq: 1.909800000 GHz Radio Std: None

Trig: Free Run Counts: 3.18 M/10.0 Mpt

#F Gain: low #F Res: 40 dB

Average Power

19.55 dBm

11.80 % at 0dB

10.0 %	9.26 dB
1.0 %	9.41 dB
0.1 %	9.45 dB
0.01 %	9.46 dB
0.001 %	9.47 dB
0.0001 %	9.47 dB
Peak	11.33 dB
	30.88 dBm

Gaussian

Info BW 5.0000 MHz

Frequency

Center Freq

1.909800000 GHz

CF Step

5.000000 MHz

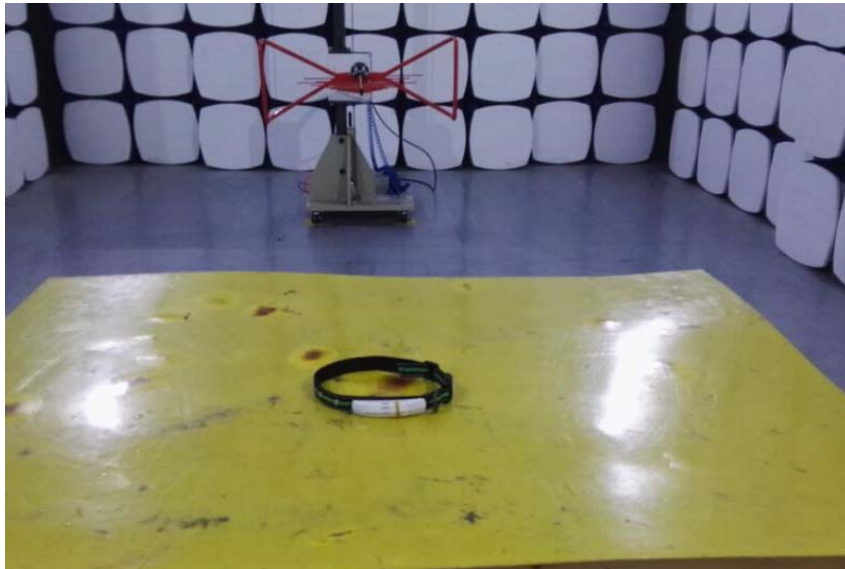
Auto

Freq Offset

0 Hz

Channel 810

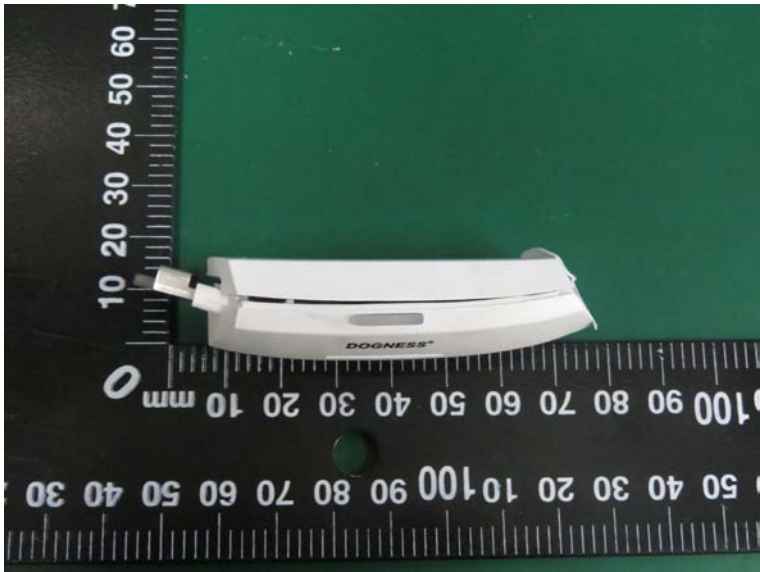
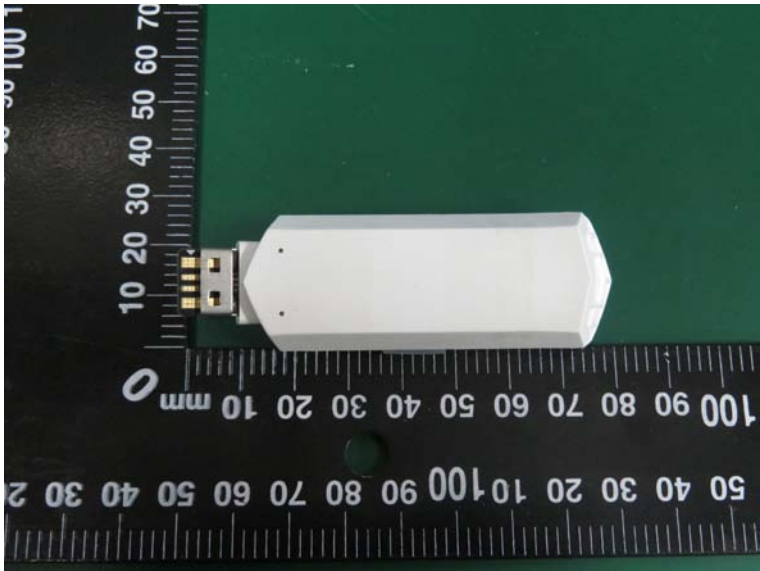
5 Test Setup Photos of the EUT

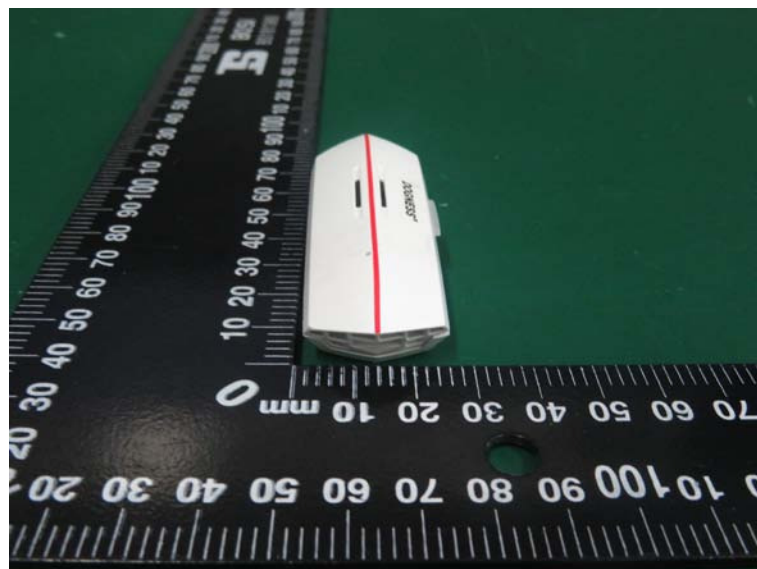
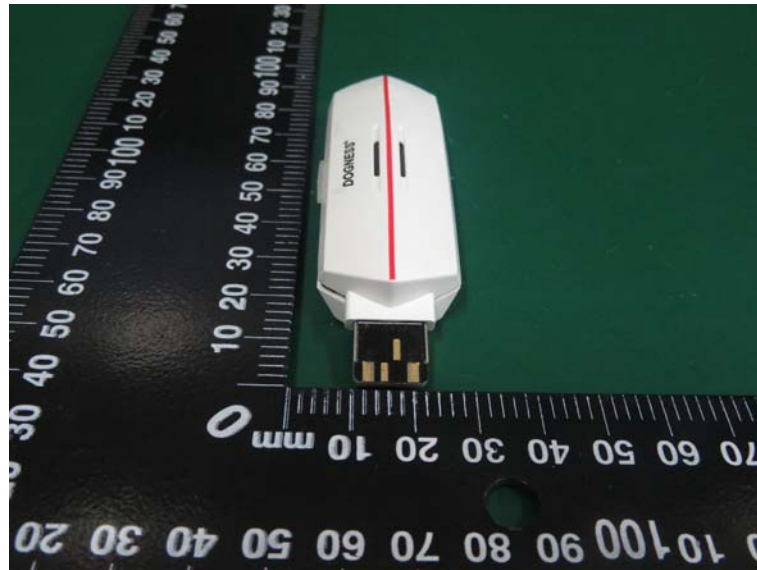


6 External and Internal Photos of the EUT

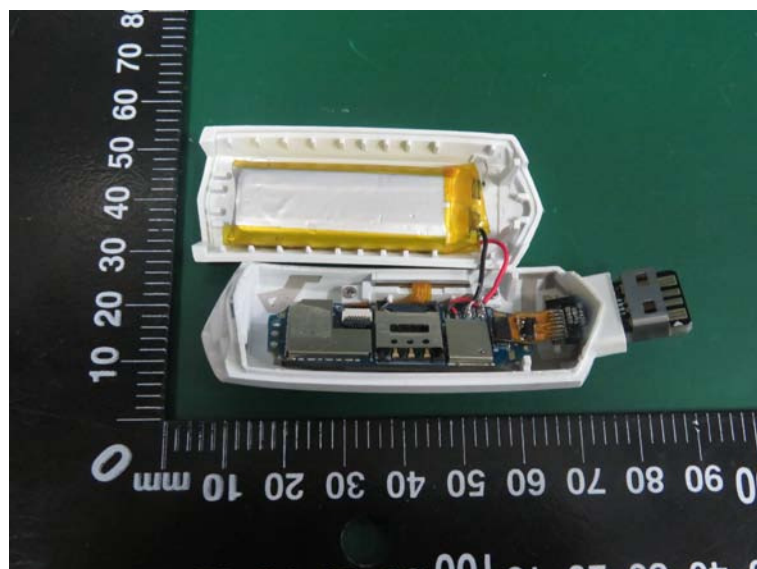
External Photos

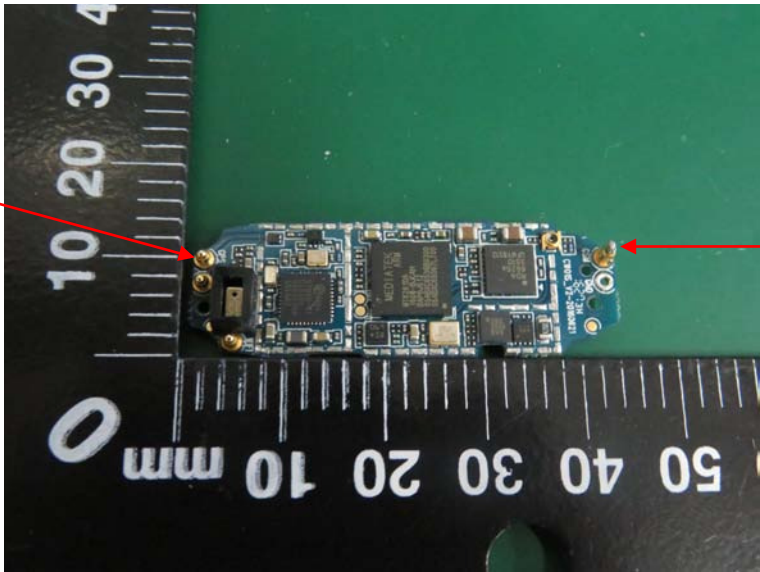
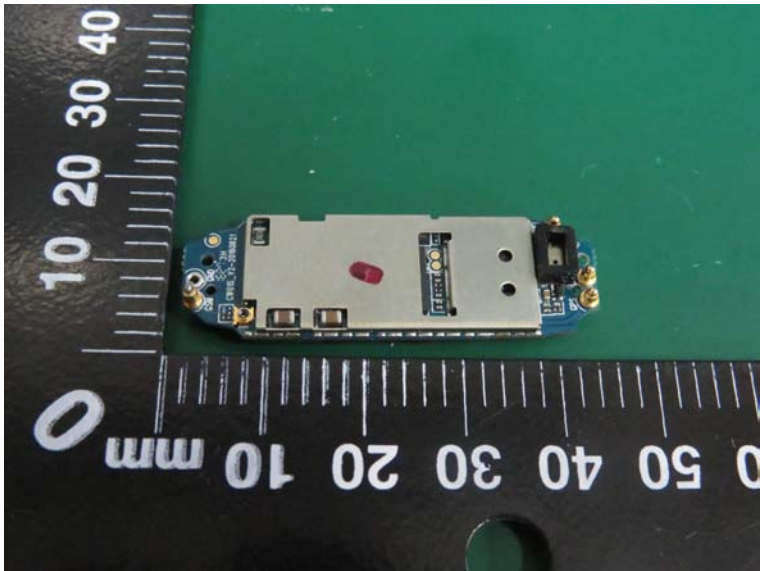
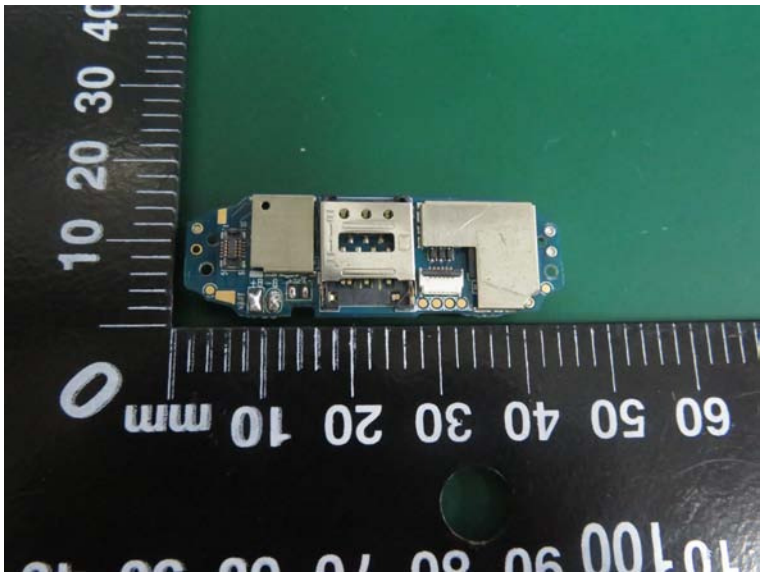






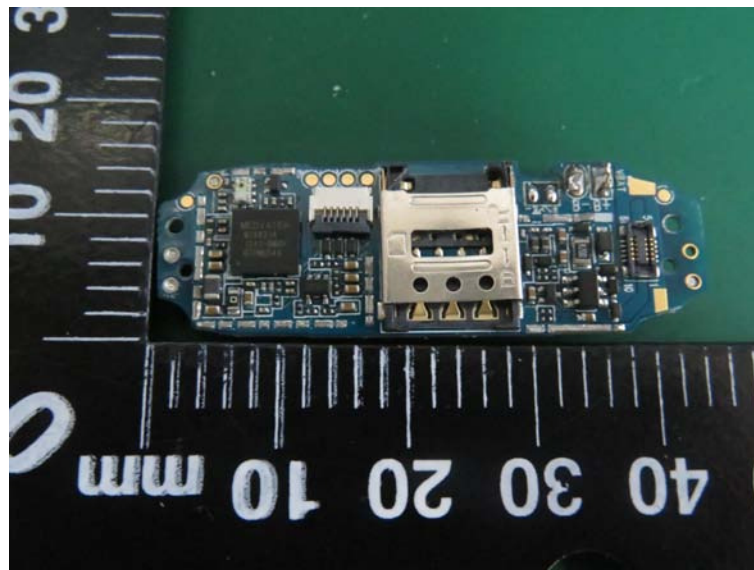
Internal Photos





GPS antenna

GSM antenna



.....End of Report.....