FCC&IC Radio Test Report

FCC ID: 2ABZ2-A2005

IC:12739A-A2005

This report concerns (check one): ☒**Original Grant** ☐**Class II Change**

Project No.	:	1506C242
Equipment	:	Mobile Phone
Model Name	:	ONE A2005
Applicant	:	OnePlus Technology (Shenzhen) Co., Ltd.
Address	:	18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China

Date of Receipt	:	Jun. 13, 2015
Date of Test	:	Jun. 13, 2015 ~ Jul. 03, 2015
Issued Date	:	Jul. 06, 2015
Tested by	:	BTL Inc.

Testing Engineer : David Mao
(David Mao)

Technical Manager : Leo Hung
(Leo Hung)

Authorized Signatory : Steven Lu
(Steven Lu)

BTL INC.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FICP-7-1506C242	Original Issue.	Jul. 06, 2015

1. CERTIFICATION

Equipment	:	Mobile Phone
Brand Name	:	ONEPLUS
Model Name	:	ONE A2005
Applicant	:	OnePlus Technology (Shenzhen) Co., Ltd.
Manufacturer	:	OnePlus Technology (Shenzhen) Co., Ltd.
Address	:	18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China
Factory	:	OnePlus Technology (Shenzhen) Co., Ltd.
Address	:	18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China
Date of Test	:	Jun. 13, 2015 ~ Jul. 03, 2015
Test Sample	:	ENGINEERING SAMPLE
Standard(s)	:	47 CFR FCC Part 24 Subpart E 47 CFR FCC Part 2 &ANSI/TIA-603-C-2004 RSS-133 Issue 6 January 2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FICP-7-1506C242)were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test result included in this report is only for theGSM 1900MHz approvalpart of the product.

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 24 Subpart E & Part 2/RSS-133 Issue 6				
Standard(s) Section		Test Item	Judgment	Remark
FCC	IC			
2.1047(d)	6.2	Modulation Characteristics	PASS	
2.1046 24.232(c)	6.4	Radiated RF Output	PASS	
2.1049 24.238(a)	-	99% Occupied Bandwidth	PASS	
2.1051 24.238(a)	6.5	Spurious Emissions at Antenna Terminal	PASS	
2.1053 24.238(a)	6.5	Spurious Radiated Emissions	PASS	
24.238(a)	6.5	Band Edge Emissions	PASS	
2.1055 24.235	6.3	Frequency Stability	PASS	
24.232(d)	6.4	Peak to Average Ratio	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this test report

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3,Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.
BTL's test firm number for FCC: 319330
BTL's test firm number for IC: 4428B-1

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimatedfor tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

The reported uncertainty of measurement **y** ±**U**, where expanded uncertainty **U** is based on astandard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95**% ◦

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB	Note
DG-CB03 (3m)	CISPR	9KHz~30MHz	V	3.79	
		9KHz~30MHz	H	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.78	
		200MHz ~ 1,000MHz	V	4.10	
		200MHz ~ 1,000MHz	H	4.06	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	H	4.14	

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Mobile Phone	
Brand Name	ONEPLUS	
Model Name	ONE A2005	
Model Difference	N/A	
Product Description	Operation Frequency:	TX:1850.2MHz~1909.8MHz RX:1930.2MHz~1989.8MHz
	Modulation Type:	GMSK;8-PSK
	EIRP Output Power	27.71dBm
PowerSource	#1 DC Voltage supplied from AC/DC adapter. 1) Brand / Model: ONEPLUS/YJ1100 2) Brand / Model: ONEPLUS/AY0520 #2 Supplied from battery. Model: BLP597	
Power Rating	#1 1) I/P: 100-240V~ 50-60Hz0.4A O/P: DC 5V 2A 2) I/P: 100-240V~ 50-60Hz 0.3A O/P: DC 5V 2A #2 DC 3.8V 3200mAh/3300mAh (min/typ)	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. Channel List:

Band	Channel	Frequency (MHz)	
1850.2MHz~1909.8MHz	512	Low	1850.20
	661	Mid	1880.00
	810	High	1909.80

3. Table for Filed Antenna @GSM1900:

Ant.	Manufacture	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	-1.57

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Items	Worst TX Mode	Channel
Radiated RF Output	GSM/EDGE	512/661/810
Spurious Radiated Emissions	GSM/EDGE	661
Band Edge Emissions	GSM/GPRS/EDGE	512/810
Frequency Stability	GSM/EDGE	661
99% Occupied Bandwidth	GSM/GPRS/EDGE	512/661/810
Spurious Emissions at Antenna Terminal	GSM	512/661/810
Peak to Average Ratio	GSM/EDGE	661

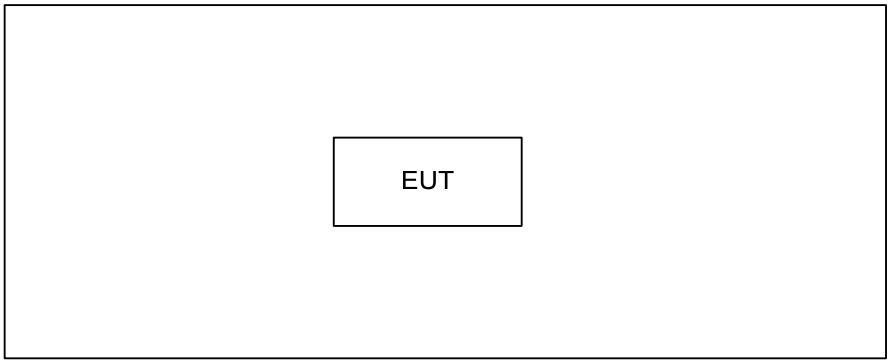
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

(3) Both adapter and battery are evaluated, operated the battery is the worst and recorded as below test data

3.3BLOCKDIGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



3.4DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
-	-	-	-	-	-	

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	

4. TEST RESULT

4.1 RADIATEDRF OUTPUT POWER MEASUREMENT

4.1.1LIMIT

The Radiated Peak Output Power shall be according to the specific rule Part 24.232(b)&RSS-133 section 6.4 that “Mobile/Portable station are limited to 2 watts e.i.r.p.” and 24.232(c)&RSS-133 section 6.4 specifed that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.

4.1.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

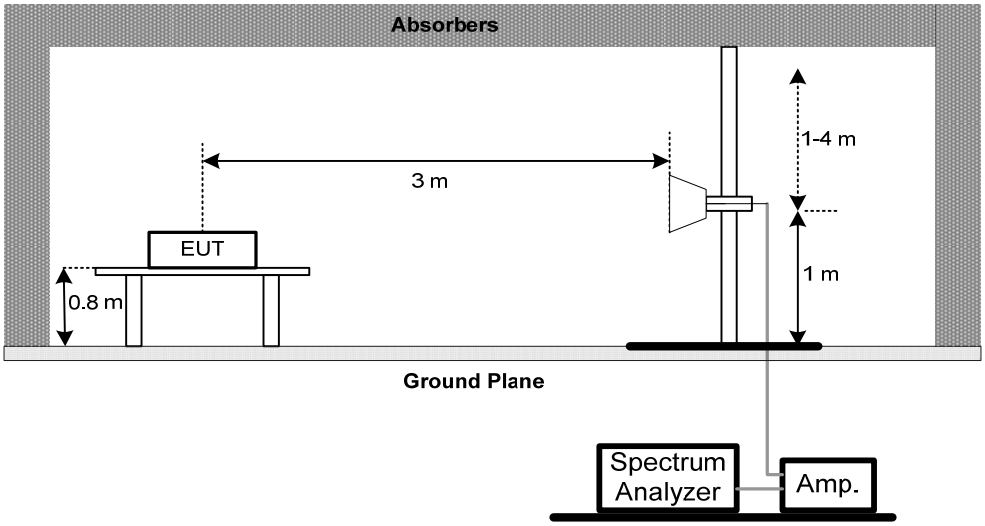
Spectrum Parameters	Setting
Attenuation	Auto
Center Frequency	Low / middle / high channels
Span Frequency	10MHz
RB / VB	3MHz / 3MHz for Peak

4.1.3 TEST PROCEDURE

EIRP/ERP:

1. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for WCDMA & CDMA, and 10MHz for LTE mode.
2. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
3. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value“ of step b. Record the power level of S.G
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of Integral, E.R.P power=E.I.P.R power-2.15dBi.

4.1.4TESTSETUP LAYOUT
EIRP Power Measurement



4.1.5 TESTDEVIATION

There is no deviation with the original standard.

4.1.6EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.1.7EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage:DC 3.8V

4.1.8TEST RESULTS

Please refer to the Attachment A.

4.2 99% OCCUPIED BANDWIDTH MEASUREMENT

4.2.1 LIMIT

According to FCC 2.1049(h) specified that emission bandwidth is defined as thewidth of the signal between two points,one below the carrier center frequencyand one above the carrier center frequency,outside of which all emissionsare attenuated at least 26 dB below thetransmitter power.

4.2.2 MEASURING INSTRUMENTS AND SETTING

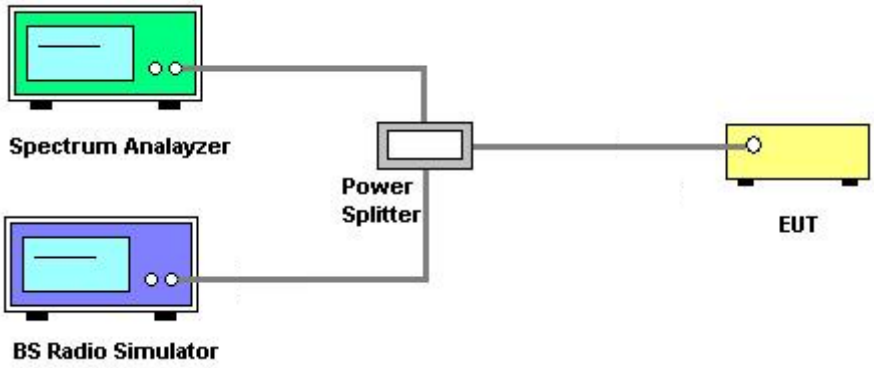
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) ofthe signal
RB	30 kHz
VB	100 kHz
Trace	Max Hold

4.2.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Used measurement function of spectrum to measure the 99% occupied bandwidth..

4.2.4TESTSETUP LAYOUT



4.2.5 TESTDEVIATION

There is no deviation with the original standard.

4.2.6EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.2.7EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage: DC 3.8V

4.2.8TEST RESULTS

Please refer to the Attachment B.

4.3SPURIOUS EMISSIONS AT ANTENNA TERMINALS MEASUREMENT

4.3.1LIMIT

In the FCC 24.238(a)&&RSS-133 section 6.5, on any frequency outside a licensee'sfrequency block within GSM spectrum, the power of anyemission shall be attenuated below thetransmitter 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.

4.3.2 MEASURING INSTRUMENTS AND SETTING

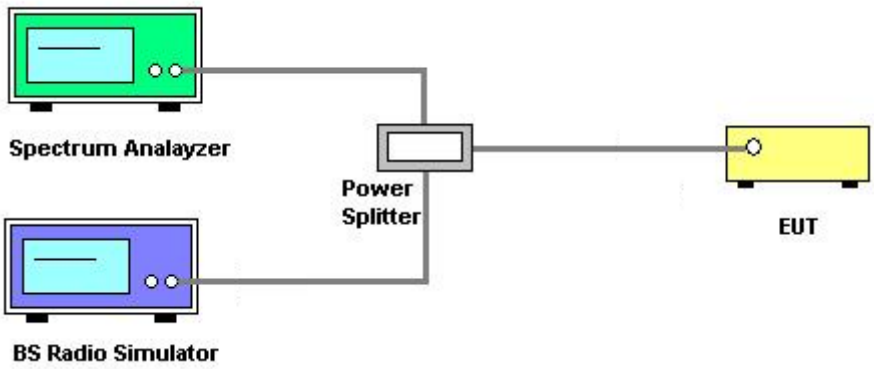
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Start Frequency	30MHz
Stop Frequency	10th carrier harmonic
RB / VB	1 MHz / 1MHz for Peak

4.3.3 TEST PROCEDURES

1. The EUT was set up for the maximum peak power with **GSM/EDGE** link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 512, 661 and810(low, middle and high operational frequency range.)
2. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 4dB in the transmitted path track.
3. When the spectrum scanned from 30MHz to 3GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB/VB 1MHz.
4. When the spectrum scanned from 3GHz to 10GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB/VB 1MHz.

4.3.4TESTSETUP LAYOUT



4.3.5 TESTDEVIATION

There is no deviation with the original standard.

4.3.6EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.3.7EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage:DC 3.8V

4.3.8TEST RESULTS

Please refer to the Attachment C.

4.4SPURIOUS RADIATED EMISSIONS MEASUREMENT

4.4.1LIMIT

Out of band emissions, The power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside the frequency block. The spurious emissions of limit equal to –13dBm.

4.4.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	10th carrier harmonic
Detector	Positive Peak
Span	100 MHz
Sweep Time	1s
RB / VB	1 MHz / 1MHz
Attenuation	Positive Peak

4.4.3 TEST PROCEDURES

1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.4.4TESTSETUP LAYOUT

This test setup layout is the same as that shown in **section 4.1.3.**

4.4.5 TESTDEVIATION

There is no deviation with the original standard.

4.4.6EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.4.7EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage: DC 3.8V

4.4.8TEST RESULTS

Please refer to the Attachment D.

4.5 BAND EDGE MEASUREMENT

4.5.1 LIMIT

According to FCC 24.238(a)&RSS-133 section 6.5 specified that power of any emission outside of the authorized operating frequency rangesmust be attenuated below the transmitting power (P) by a factor of at least 43 +10 log(P) dB . In the 1 MHz bands immediatelyoutside and adjacent to the frequencyblock a resolution bandwidth of atleast one percent of the emission bandwidthof the fundamental emission ofthe transmitter may be employed. Then we measure that the bandwidth is about 300kHz and the resolution bandwidth is 3kHz.

4.5.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	5 MHz
RB / VB	10 kHz /30 kHz
Trace	Sample
Sweep Time	Auto

4.5.3 TEST PROCEDURES

1. The EUT was set up for the maximum peak power with **GSM/EDGE** link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels, 512 and810(low and high operational frequency range.)
2. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. The splitter loss and cable loss are the worst loss 4dB in the transmitted path track.
3. The center frequency of spectrum is the band edge frequency and span is 2 MHz. RB of the spectrum is 10kHz and VB of the spectrum is 30KHz.
4. Record the Sample trace plot into the test report.

4.5.4 TESTSETUP LAYOUT

This test setup layout is the same as that shown in section 4.2.4.

4.5.5 TESTDEVIATION

There is no deviation with the original standard.

4.5.6 EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.5.7 EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage: DC 3.8V

4.5.8TEST RESULTS

Please refer to the Attachment E.

4.6FREQUENCY STABILITY MEASUREMENT

4.6.1LIMIT

According to the FCC part 24.235&RSS-133 section 6.3 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficientto ensure that the fundamentalemission stays within the authorizedfrequency 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 receivedfrequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from85 to 115 percent of the nominal valuefor other than hand carried batteryequipment and the extreme temperature rule is comply with the 2.1055(a)(1) –30℃~50℃.

4.6.2 MEASURING INSTRUMENTS AND SETTING

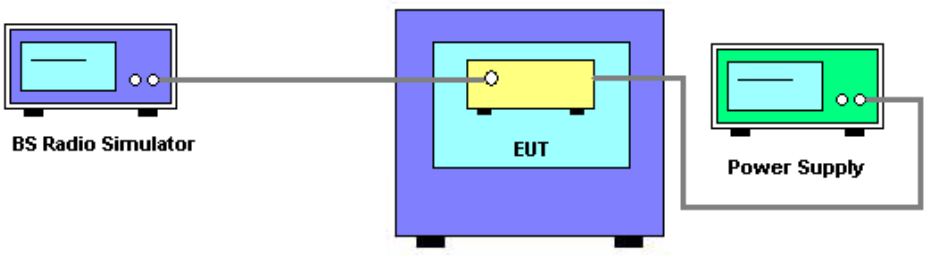
Please refer to section 5 in this report. The following table is the setting of the BS Simulator.

Spectrum Parameters	Setting
Frequency Error	The maximum of transmit frequency error

4.6.3 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the BS Simulator.
2. The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns.
3. BS simulator used the frequency error function and measured the peak frequency error. Power must be removed when changingfrom one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.
   The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 3.1 Volts to 4.3 Volts. Each step shall be record the frequency error rate.
5. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
6. Reduced operating temperature range of -10° ~ +45° C as defined in Operational description and declared in User Manual.

4.6.4TESTSETUP LAYOUT



4.6.5 TESTDEVIATION

There is no deviation with the original standard.

4.6.6EUT OPERATIONDURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.6.7EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage: DC 3.8V

4.6.8TEST RESULTS

Please refer to the Attachment F.

4.7PEAK TO AVERAGE RATIO

4.7.1LIMIT

In the FCC 24.232 (d)&&RSS-133 section 6.4
Peak transmit power shall be measured over any interval of continuous transmission using instrumen-tation calibrated in terms of rms-equivalent voltage.
The measurement results shall be properly adjusted for any instrument limitations, such as detector re-sponse times, limited resolution bandwidth capability when compared to the emission bandwidth, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.
To measure transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission shall not exceed 13 dB.

4.7.2 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;

4.7.3TESTSETUP LAYOUT

Please refer to section 3.4 in this report.

4.7.4 TESTDEVIATION

There is no deviation with the original standard.

4.7.5EUT OPERATIONDURING TEST

The BS simulator was used to set the TX channel and power level and modulate the TX signal.

4.7.6EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 55%
Test Voltage:DC 3.8V

4.7.7TEST RESULTS

Please refer to the Attachment G.

5. LIST OF MEASUREMENT EQUIPMENTS

Radiated Emission & ERP or EIRP Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 28, 2016
2	Amplifier	HP	8447D	2944A09673	Nov. 17, 2015
3	Receiver	AGILENT	N9038A	MY52130039	Sep. 30, 2015
4	Test Cable	emci	LMR-400(30MHz-1GHz)	C-01	Jun. 28, 2016
5	Controller	CT	SC100	N/A	N/A
6	Antenna	ETS	3115	00075789	Mar. 28, 2016
7	Amplifier	Agilent	8449B	3008A02274	Nov. 02, 2015
8	Receiver	AGILENT	N9038A	MY52130039	Sep. 30, 2015
9	Test Cable	emci	EMC104-SM-SM-10000(1GHz－26.5GHz)	C-68	Jun. 28, 2016
10	Controller	CT	SC100	N/A	N/A
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 28, 2016
12	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 28, 2016
13	Double Ridged Guide Antenna	ETS·LINDGREN	3115	00075846	Mar. 28, 2016
14	Antenna	SCHWARZBECK	VULB 9160	9160-3231	Mar. 28, 2016
15	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Nov. 02, 2015
16	Signal Generator	R&S	SMR40	100504	Mar. 28, 2016
17	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 28, 2016
2	Wireless Communication Test SET	（8960 Series ） Agilent	E5515C	MY48364183	Mar. 28, 2016
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 17, 2016
4	Test Cable	N/A	CL-CB12-001	N/A	Oct. 22, 2015
5	Test Cable	N/A	CL-CB12-004	N/A	Oct. 22, 2015

Band Edge Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 28, 2016
2	Wireless Communication Test SET	（8960 Series ） Agilent	E5515C	MY48364183	Mar. 28, 2016
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 17, 2016
4	Test Cable	N/A	CL-CB12-001	N/A	Oct. 22, 2015
5	Test Cable	N/A	CL-CB12-004	N/A	Oct. 22, 2015

99% Occupied Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 28, 2016
2	Wireless Communication Test SET	（8960 Series ） Agilent	E5515C	MY48364183	Mar. 28, 2016
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 17, 2016
4	Test Cable	N/A	CL-CB12-001	N/A	Oct. 22, 2015
5	Test Cable	N/A	CL-CB12-004	N/A	Oct. 22, 2015

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	（8960 Series ） Agilent	E5515C	MY48364183	Mar. 28, 2016
2	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 17, 2016
3	Test Cable	N/A	CL-CB12-001	N/A	Oct. 22, 2015
4	Const Temp. & Humidity Chamber	GIANT FORCE	ITH-1200-40-CP-AR	IAA1210-003	Aug. 01, 2015
5	DC power supply	GW Instek	GPC-30300N	EK880675	Oct.12, 2015

Peakto Average Ratio					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 28, 2016
2	Wireless Communication Test SET	（8960 Series ） Agilent	E5515C	MY48364183	Mar. 28, 2016
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 17, 2016
4	Test Cable	N/A	CL-CB12-001	N/A	Oct. 22, 2015
5	Test Cable	N/A	CL-CB12-004	N/A	Oct. 22, 2015

Remark: ”N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

6. EUT TEST PHOTO

Radiated Measurement Photos

9KHz to 30MHz

Radiated Measurement Photos

30MHz to 1000MHz

Radiated Measurement Photos

Above 1000MHz

ATTACHMENTA -RADIATED RF OUTPUT POWER

Test Mode:	TX CH 512/661/810-GSM

GSM 1900		EIRP Power(dBm)			Max. Limit(dBm)	Result
		Channel 512	Channel 661	Channel 810		
GSM	H	27.41	27.71	27.48	33	Complies
EDGE	H	24.81	25.11	25.12	33	Complies

GSM 850		Conducted Power(dBm)		
		Channel 512	Channel 661	Channel 810
GSM (CS)		30.77	30.74	30.67
GPRS (GMSK)	1 Tx Slot	30.70	30.67	30.62
	2 Tx Slot	27.70	27.54	27.62
	3 Tx Slot	27.15	27.31	27.13
	4 Tx Slot	25.37	25.27	25.34
EDGE (8PSK)	1 Tx Slot	25.71	25.82	25.87
	2 Tx Slot	24.15	24.20	24.72
	3 Tx Slot	24.08	24.04	24.09
	4 Tx Slot	23.97	23.91	23.81

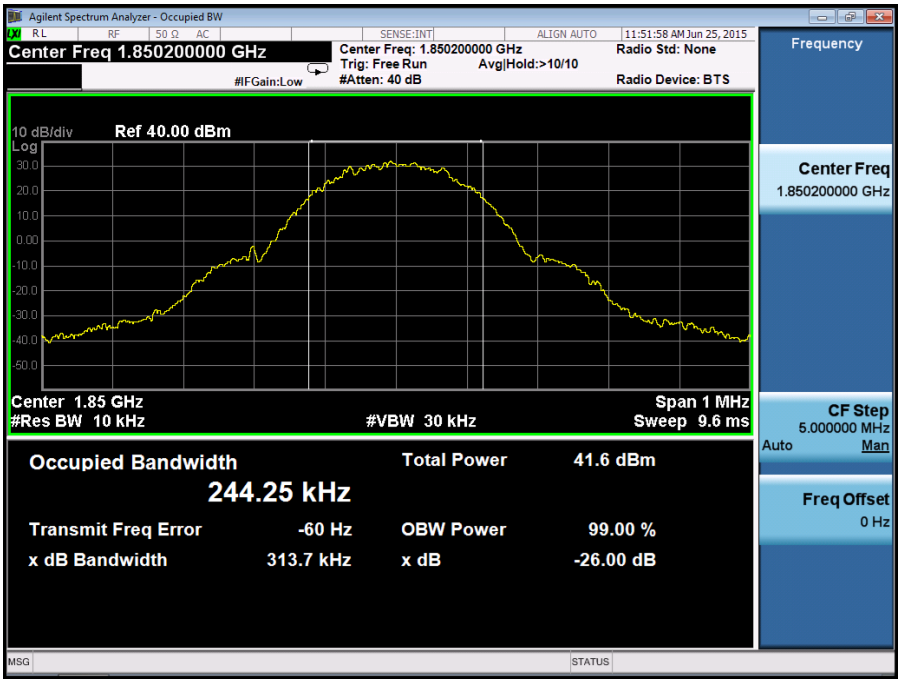
REMARKS:

1. Radiated Output Power(dBm)=Raw Value(dBm) + Correction Factor(dB) +Ant Gain(dBi)
2. Correction Factor(dB) = Power SplitterLoss(dB) + Cable Loss(dB)
3. The antenna gain is-1.57dBi
4. Tests have been conducted for both vertical and horizontal plane and the worst case was found in horizontal plane and the results were selected and recorded in the report

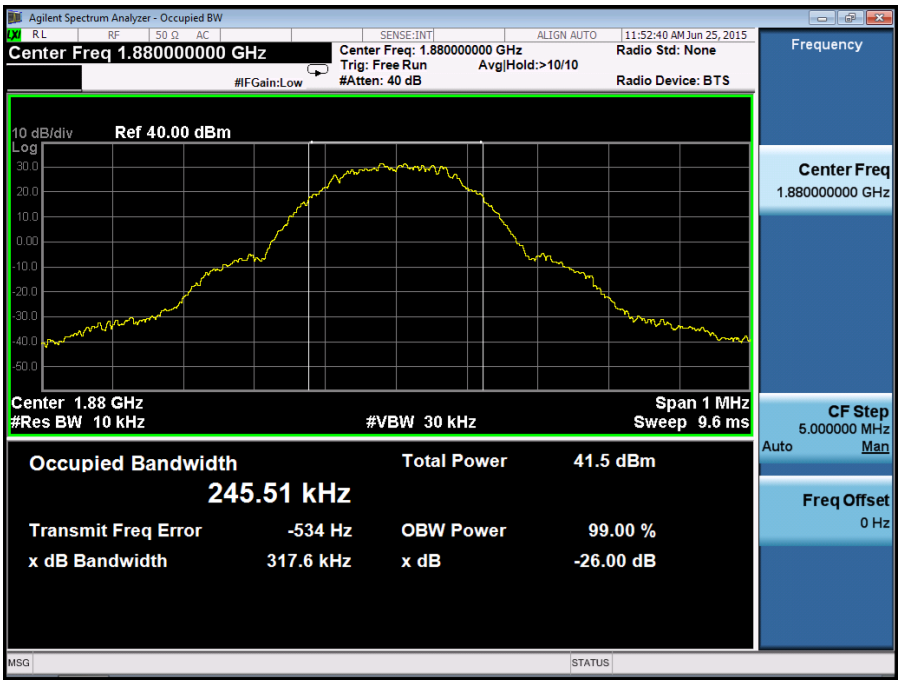
ATTACHMENT B - 99% OCCUPIED BANDWIDTH

Test Mode : TX Mode ConfigurationGSM				
Channel	**Frequency**	**99% OBW (MHz)**	**-26dBc Bandwidth(MHz)**	**Result**
512	1850.20MHz	0.244	0.314	**Complies**
661	1880.00 MHz	0.246	0.318	**Complies**
810	1909.80 MHz	0.243	0.316	**Complies**

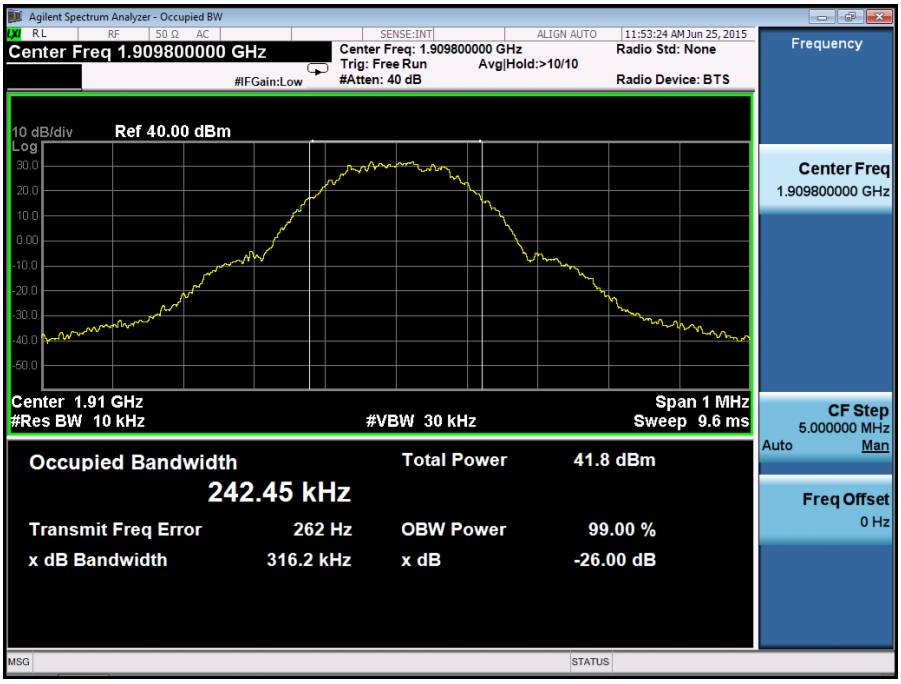
99% Occupied Bandwidth channel 512



99% Occupied Bandwidth channel 661

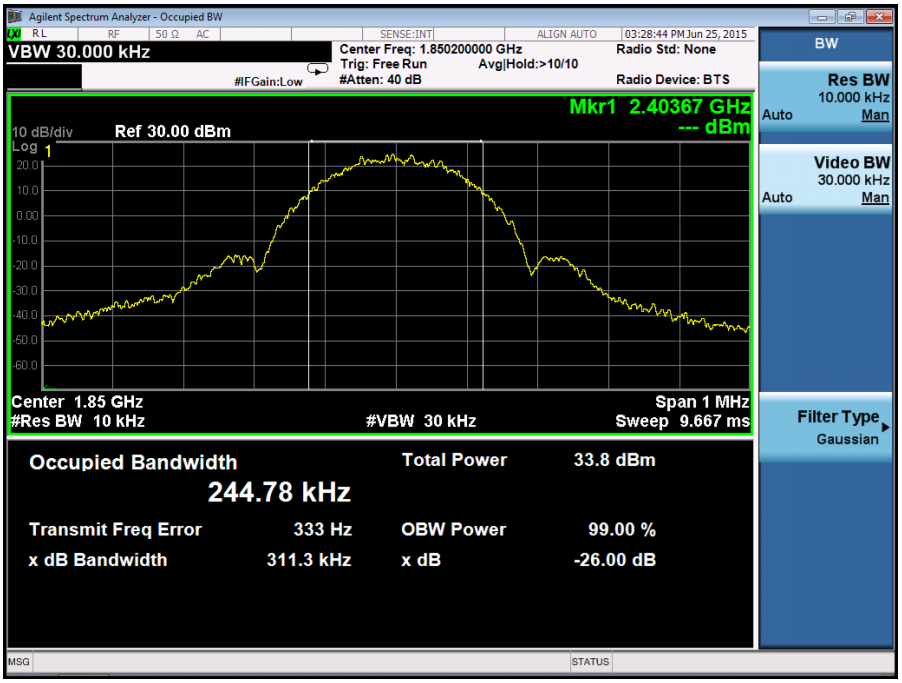


99% Occupied Bandwidth channel 810

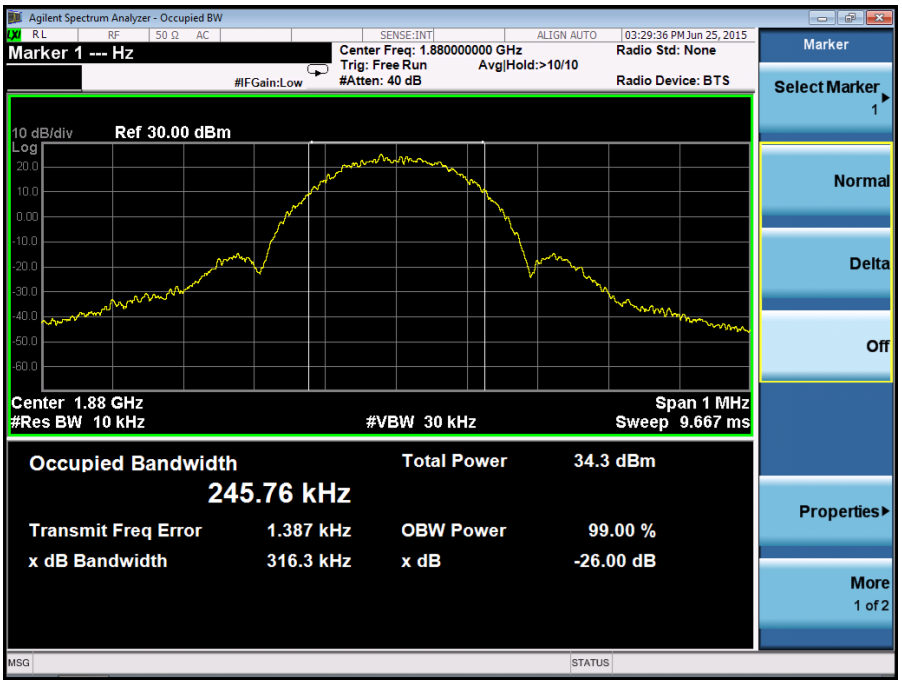


Test Mode : TX Mode ConfigurationEDGE				
Channel	**Frequency**	**99% OBW (MHz)**	**-26dBc Bandwidth(MHz)**	**Result**
512	1850.20MHz	0.245	0.311	**Complies**
661	1880.00 MHz	0.246	0.316	**Complies**
810	1909.80 MHz	0.246	0.309	**Complies**

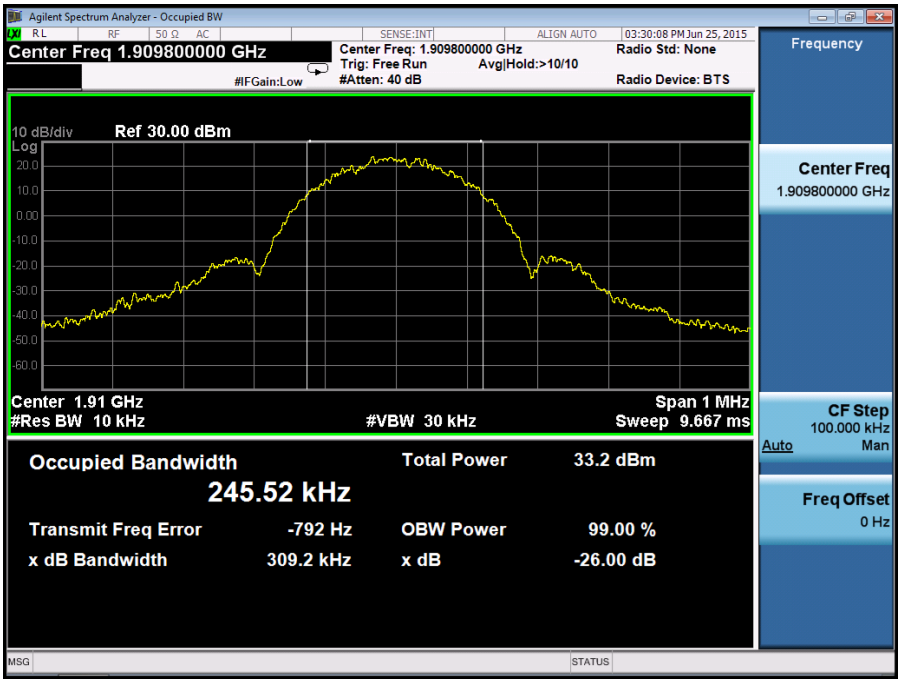
99% Occupied Bandwidth channel 512



99% Occupied Bandwidth channel 661



99% Occupied Bandwidth channel 810



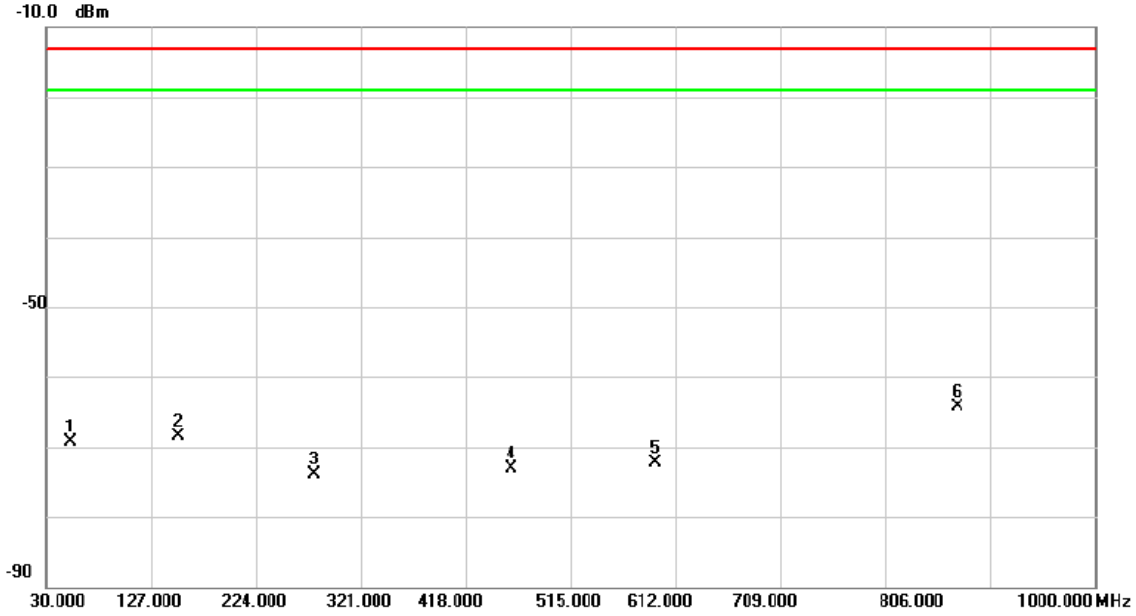
ATTACHMENT C - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Conducted Spurious of Configuration-GSMchannel 661

ATTACHMENTD - SPURIOUS RADIATED EMISSION

Test Mode:	TX CH661 GSM

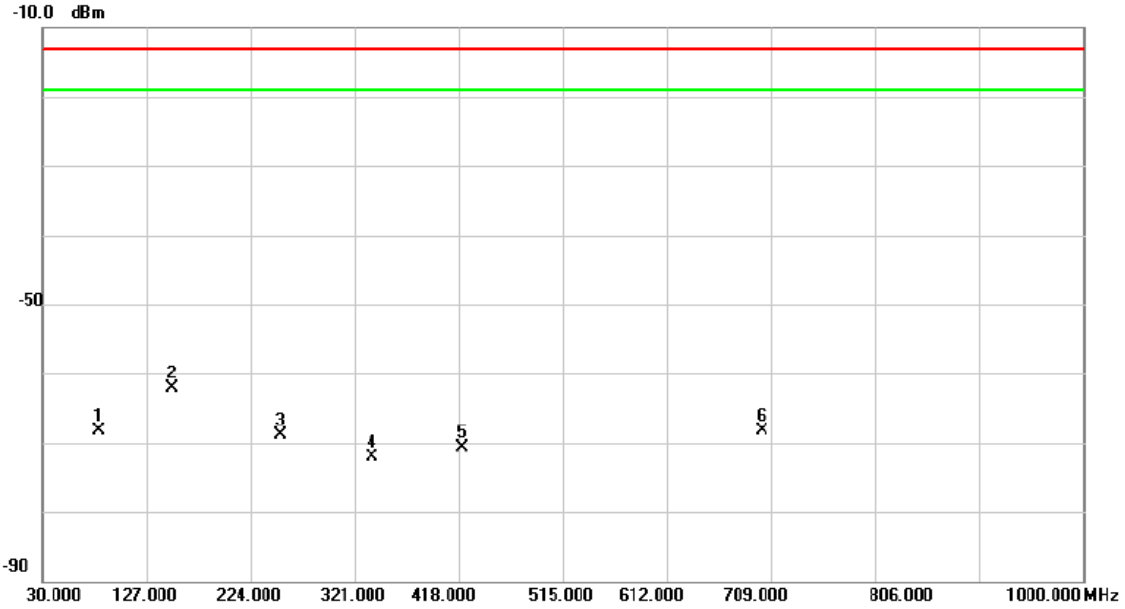
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		52.3100	-70.82	1.58	-69.24	-13.00	-56.24	peak	
2		152.2200	-71.74	3.16	-68.58	-13.00	-55.58	peak	
3		277.3500	-76.52	2.53	-73.99	-13.00	-60.99	peak	
4		459.7100	-78.91	5.84	-73.07	-13.00	-60.07	peak	
5		592.6000	-80.76	8.52	-72.24	-13.00	-59.24	peak	
6	*	871.9600	-78.07	13.69	-64.38	-13.00	-51.38	peak	

Test Mode:	TX CH661 GSM

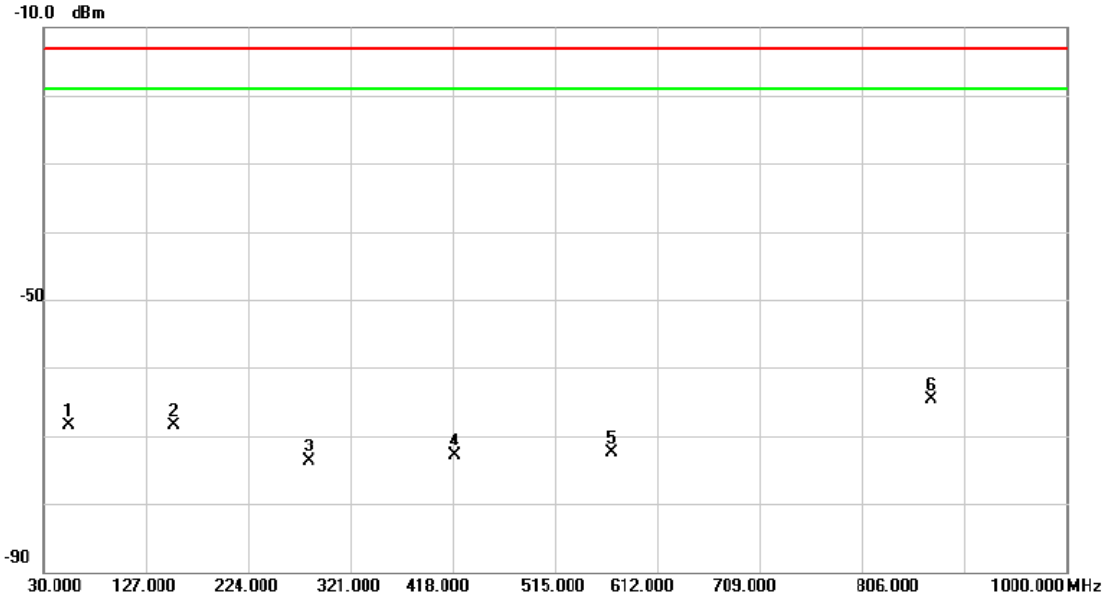
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		82.3800	-60.65	-7.64	-68.29	-13.00	-55.29	peak	
2	*	151.2500	-66.06	4.05	-62.01	-13.00	-49.01	peak	
3		252.1300	-70.84	1.88	-68.96	-13.00	-55.96	peak	
4		336.5200	-74.56	2.49	-72.07	-13.00	-59.07	peak	
5		420.9100	-77.48	6.78	-70.70	-13.00	-57.70	peak	
6		700.2700	-82.25	13.97	-68.28	-13.00	-55.28	peak	

Test Mode:	TX CH661EDGE

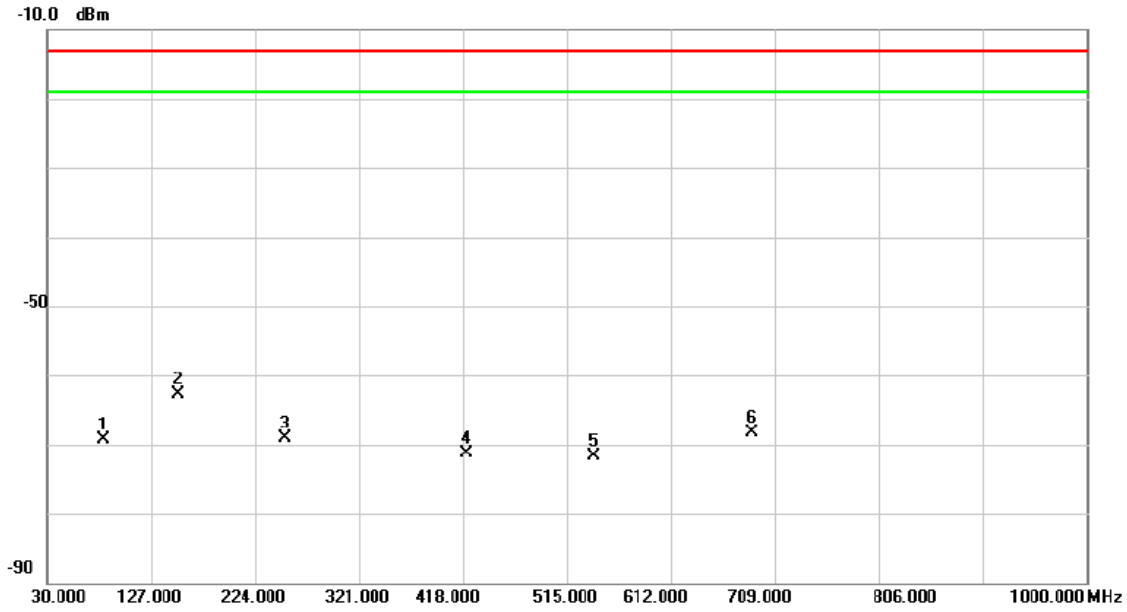
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		53.2800	-70.58	1.99	-68.59	-13.00	-55.59	peak	
2		153.1900	-71.73	3.16	-68.57	-13.00	-55.57	peak	
3		281.2300	-76.23	2.60	-73.63	-13.00	-60.63	peak	
4		419.9400	-77.60	4.65	-72.95	-13.00	-59.95	peak	
5		568.3500	-80.49	7.91	-72.58	-13.00	-59.58	peak	
6	*	870.9900	-78.37	13.72	-64.65	-13.00	-51.65	peak	

Test Mode:	TX CH661EDGE

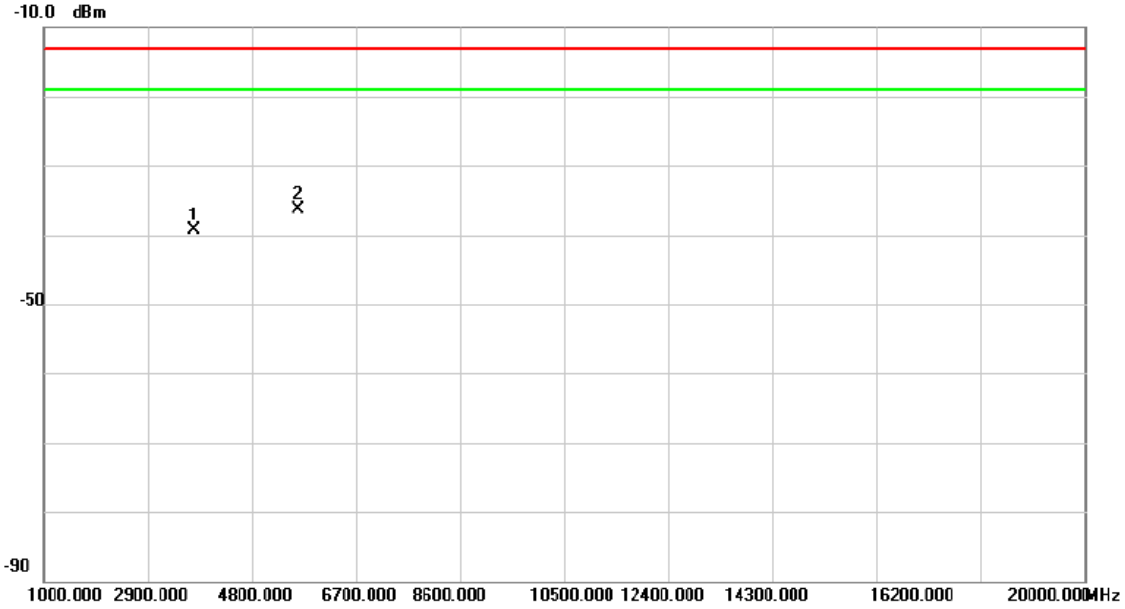
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		82.3800	-61.75	-7.64	-69.39	-13.00	-56.39	peak	
2	*	152.2200	-66.62	3.91	-62.71	-13.00	-49.71	peak	
3		251.1600	-70.88	1.88	-69.00	-13.00	-56.00	peak	
4		420.9100	-78.02	6.78	-71.24	-13.00	-58.24	peak	
5		540.2200	-79.88	8.09	-71.79	-13.00	-58.79	peak	
6		687.6600	-81.49	13.14	-68.35	-13.00	-55.35	peak	

Test Mode:	TX CH661 GSM

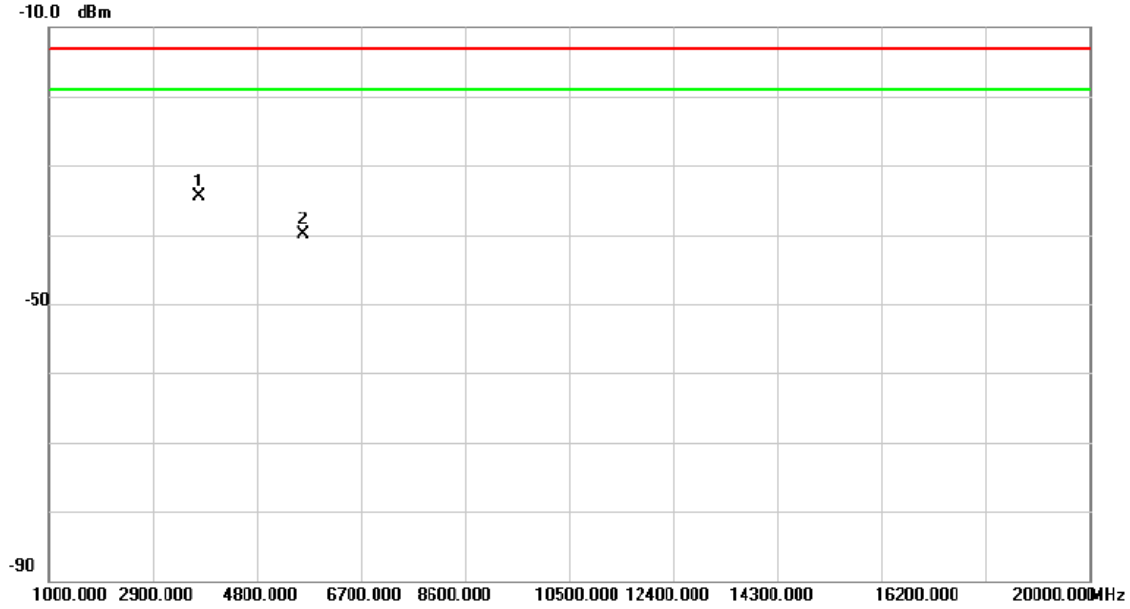
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		3755.000	-48.34	9.04	-39.30	-13.00	-26.30	peak	
2	*	5636.000	-53.33	17.13	-36.20	-13.00	-23.20	peak	

Test Mode:	TX CH661 GSM

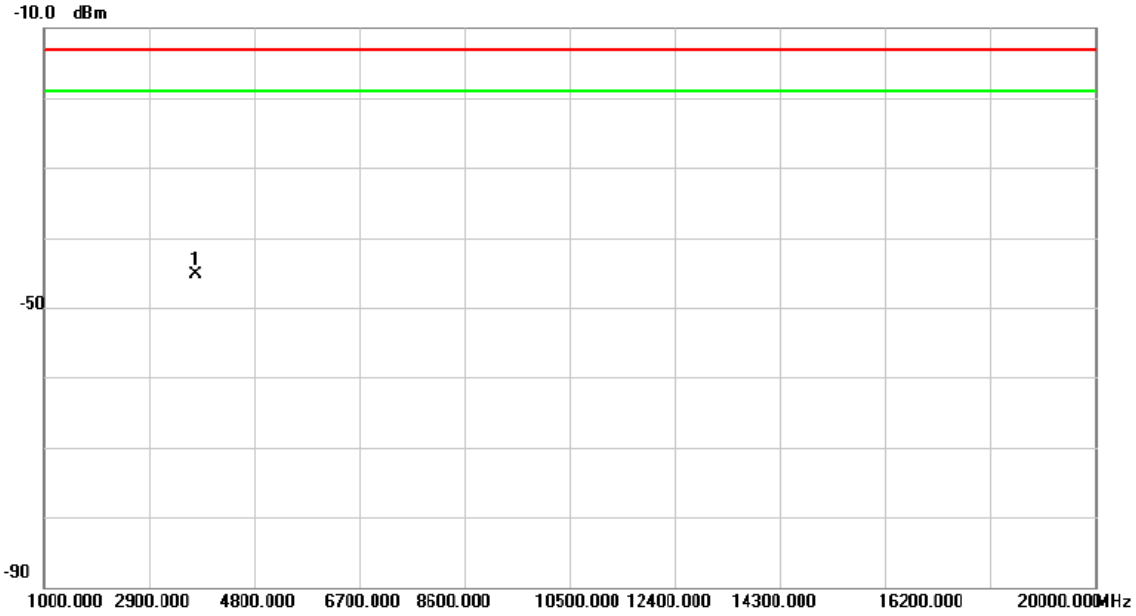
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3755.000	-44.92	10.44	-34.48	-13.00	-21.48	peak	
2		5636.000	-51.03	11.18	-39.85	-13.00	-26.85	peak	

Test Mode:	TX CH661EDGE

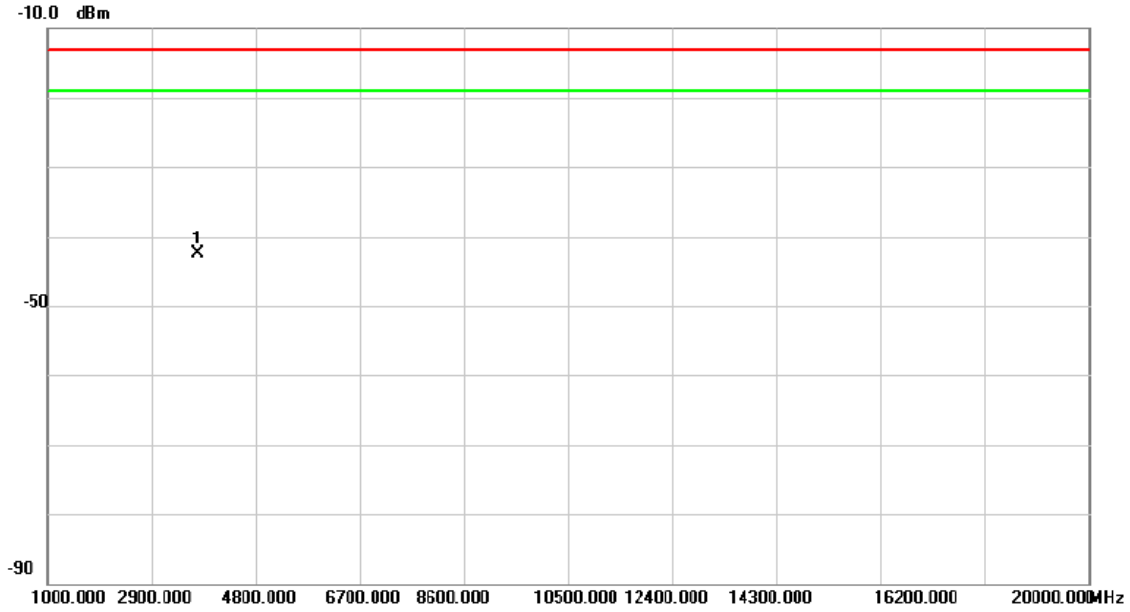
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3755.000	-54.39	9.04	-45.35	-13.00	-32.35	peak	

Test Mode:	TX CH661EDGE

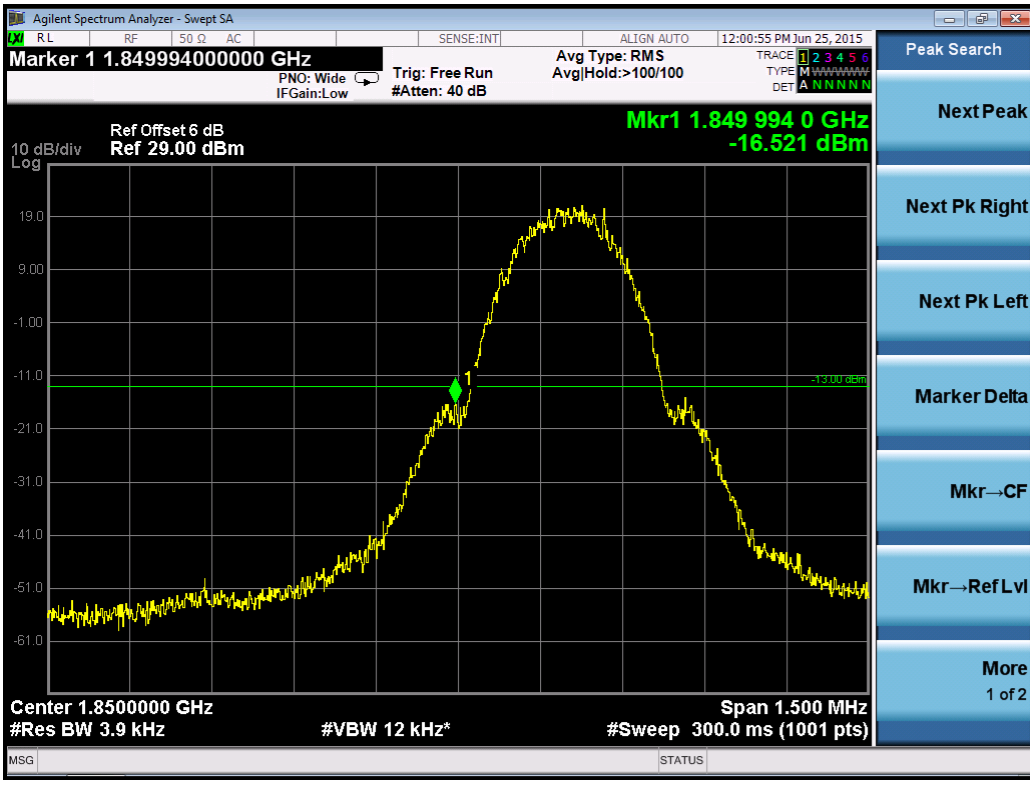
Horizontal



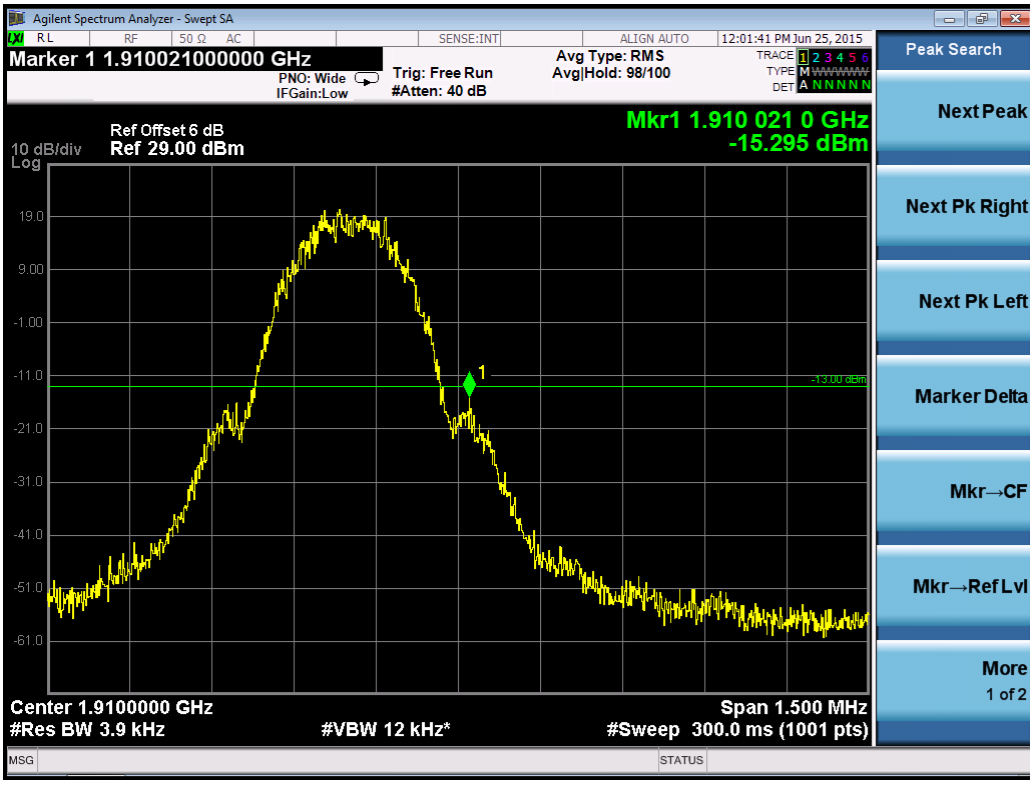
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3755.000	-52.89	10.44	-42.45	-13.00	-29.45	peak	

ATTACHMENTE - BAND EDGE

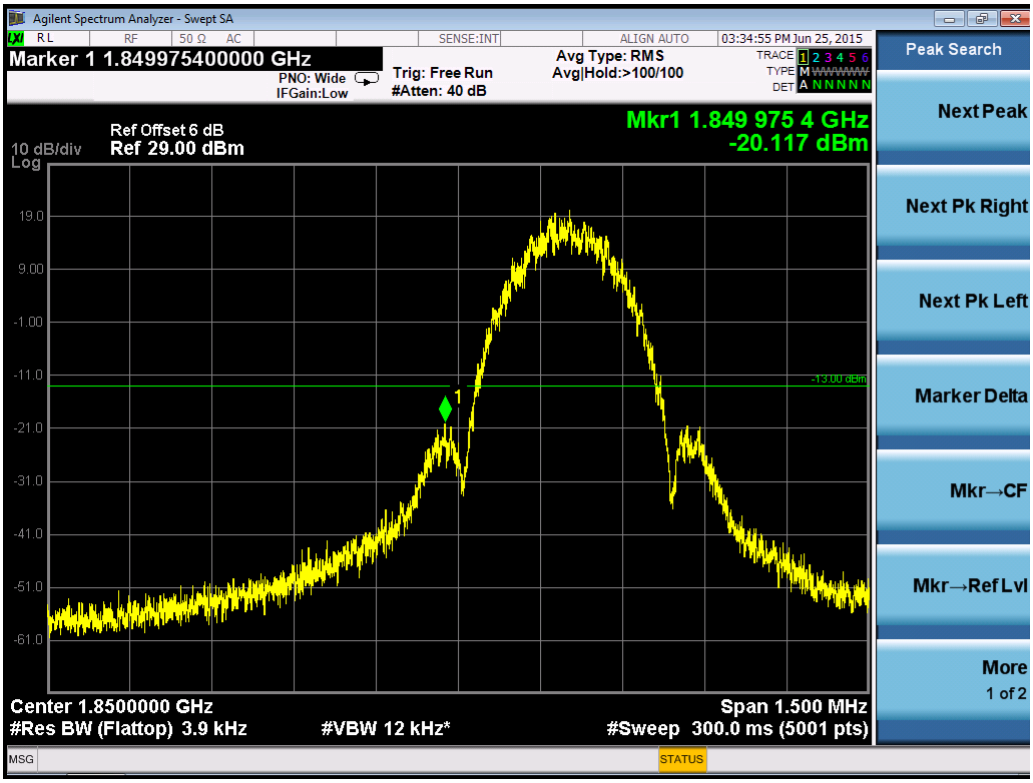
Band Edge on Configuration GSM / Channel 512-CONDUCTED MODE



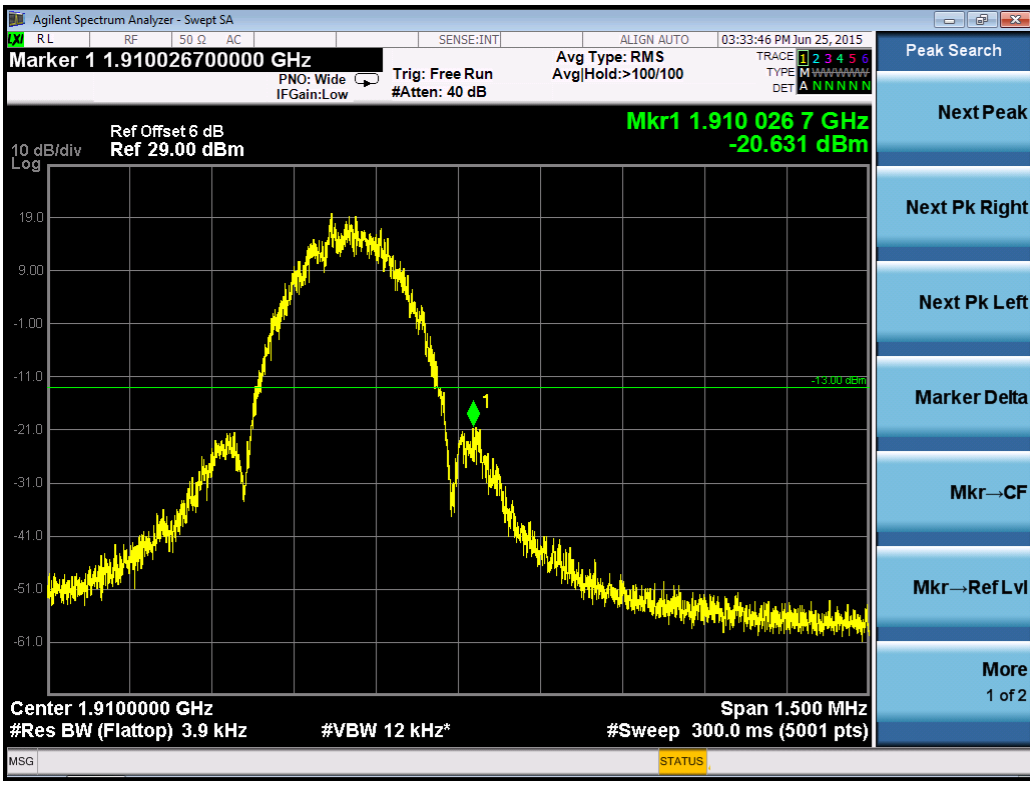
Band Edge on Configuration GSM / Channel 810-CONDUCTED MODE



Band Edge on Configuration EDGE / Channel 512-CONDUCTED MODE



Band Edge on Configuration EDGE / Channel 810-CONDUCTED MODE



ATTACHMENTF - FREQUENCY STABILITY

Test Mode:	GSM CH512

Voltage vs. Frequency Stabiility

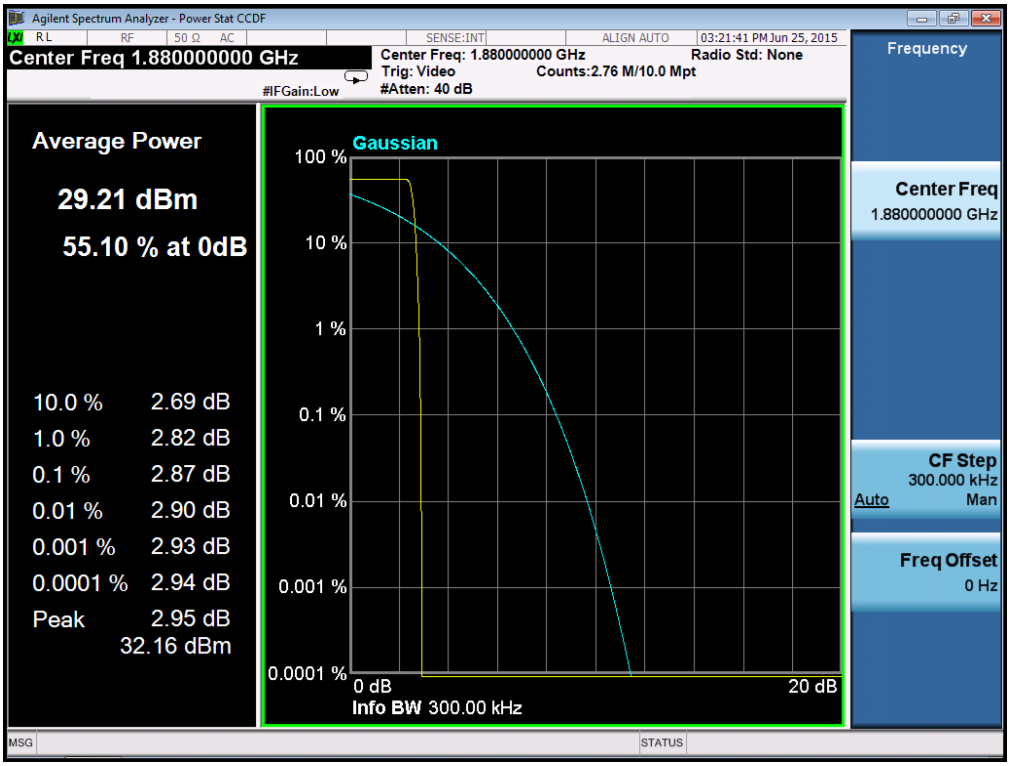
Temperature(℃)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-10	5.38	0.002907794	2.5
0	7.24	0.00391309	2.5
10	5.13	0.002772673	2.5
20	5.96	0.003221273	2.5
30	3.73	0.002015998	2.5
40	3.29	0.001778186	2.5
45	7.35	0.003972544	2.5
Max. Deviation (ppm)	**7.35**	**0.003972544**	2.5

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
3.8	8.52	0.004604908	2.5
3.5	7.12	0.003848233	2.5
4.35	8.54	0.004615717	2.5
Max. Deviation (ppm)	**8.54**	**0.004615717**	2.5

ATTACHMENTG - PEAK TO AVERAGE RATIO

Peak to Average Ratio of Configuration-GSMchannel 661



Peak to Average Radio of Configuration-EDGEchannel 661