

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E REQUIREMENT OF

Product Name: Smart Tracker
Brand Name: Athentek
Model No.: AT502
Model Difference: N/A
FCC ID: 2AHNY-AT502
Report No.: E2/2016/20033
Issue Date: Mar. 11, 2016
FCC Rule Part: 2 , 22H & 24E
Prepared for: Athentek Corp.
7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu
Dist., Taipei City 114, Taiwan
Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No.2, Keji 1st Rd., Guishan District, Taoyuan
City, Taiwan 333

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VERIFICATION OF COMPLIANCE

Applicant: Athentek Corp.
7F., No.10, Ln. 360, Sec. 1, Neihu Rd, Neihu Dist., Taipei City
114, Taiwan

Product Name: Smart Tracker

Brand Name: Athentek

Model No.: AT502

Model Difference: N/A

FCC ID: 2AHNY-AT502

File Number: E2/2016/20033

Date of test: Feb. 24, 2016 ~ Mar. 10, 2016

Date of EUT Received: Feb. 24, 2016

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:**Date**

Mar. 11, 2016

Aken Huang / Engineer**Prepared By:****Date**

Mar. 11, 2016

Tiffany Kao / Clerk**Approved By:****Date**

Mar. 11, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
E2/2016/20033	Rev.00	Initial creation of document	Mar. 11, 2016

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1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	Smart Tracker	
Brand Name:	Athentek	
Model No.:	AT502	
Model difference:	N/A	
Hardware Version:	DVT	
Software Version:	0.5.13	
Power Supply:	3.7Vdc from Rechargeable Li-ion Battery	
	Battery:	Model No.: N/A; Supplier: N/A

GPRS / WCDMA:

Cellular Phone Standards Frequency Range and Power	Operating Frequency		Rated Power
	GPRS 850	824.2 MHz– 848.8 MHz	33dBm
	GPRS 1900	1850.2MHz – 1909.8MHz	30dBm
Type of Emission:	GPRS 850	248KGXW	
	GPRS 1900	250KGXW	

Max ERP/EIRP measurement result:

	dBm		W
GPRS 850 Band	27.76	ERP	0.597
GPRS 1900 Band	28.82	EIRP	0.762

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1.2. Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting, GSM, Wi-Fi and Bluetooth features, and below is details of information.

Product Feature	
Product Name:	Smart Tracker
Brand Name:	Athentek
Model No.:	AT502
Model Difference:	N/A
FCC ID:	2AHNY-AT502
GSM Operating Band(s)	GSM 850/1900MHz
GPRS Multi Slot Class	GPRS Class 12 / Class 12
Wi-Fi Specification	802.11b/g/n
Bluetooth Version	V4.0 dual mode

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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1.3. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22, 24

ANSI / TIA / EIA 603C-C-2004

KDB971168 D01 Power Meas license Digital System v02r02

TS 151 010-1 is used to set, and measure the output power.

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.

1.4. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd.,
Guishan District, Taoyuan City, Taiwan 333. (TAF code 0513)

FCC Registration Numbers are: 628985

Canada Registration Number: 4620A-5.

1.5. Special Accessories

No special accessories were used during testing.

1.6. Equipment Modifications

There were no modifications incorporated into the EUT.

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2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP)

According to measurement procured TIA/EIA 603C, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

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2.4. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Following shows an offset computation example with cable loss and attenuator.

Low Band: Offset = RF cable loss (dB) + attenuation factor (dB) = 14.8 (dB)

High Band: Offset = RF cable loss (dB) + attenuation factor (dB) = 14.8 (dB)

2.5. Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
GPRS 850	3.7	180
GPRS 1900	3.7	72

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2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)

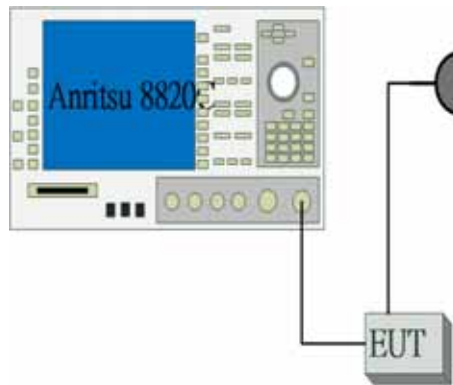


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)

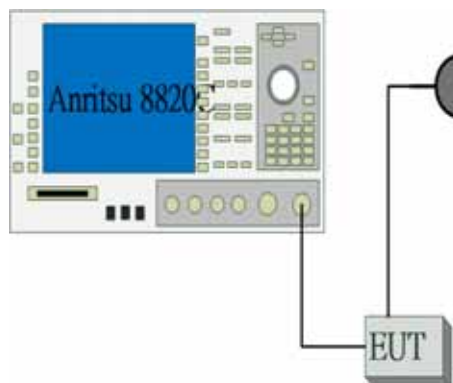


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Radio Communication Analyzer	Anritsu	8820C	6201107337	shielded	Un-shielded
2.	Test Software	DRTU	N/A	N/A	N/A	N/A

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a)	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	ERP/ EIRP measurement	Compliant
§2.1049(h)	Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	Compliant
§24.232(d)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235	Frequency Stability	Compliant

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4. DESCRIPTION OF TEST MODES

4.1. The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	ERP/EIRP	RADIATED EMISSION
GPRS 850	E2-plan	E2-plan
GPRS 1900	E2-plan	E2-plan

GSM/GPRS/EDGE MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	128 to 251	128, 190, 251	GPRS 850
EIRP	512 to 810	512, 661, 810	GPRS 1900
FREQUENCY STABILITY	128 to 251 512 to 810	190 661	GPRS 850 GPRS 1900
OCCUPIED BANDWIDTH	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS 850 GPRS 1900
PEAK TO AVERAGE RATIO	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS 850 GPRS 1900
BAND EDGE	128 to 251 512 to 810	128, 251 512, 810	GPRS 850 GPRS 1900
CONDUCTED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS 850 GPRS 1900
RADIATED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS 850 GPRS 1900

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1.10 dB
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization = +/- 4.62dB
99% Occupied Bandwidth	+/- 5.19 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 0.70 dB
Peak to Average Ratio	+/- 0.70 dB
Frequency Stability vs. Temperature	+/- 5.19 Hz
Frequency Stability vs. Voltage	+/- 5.19 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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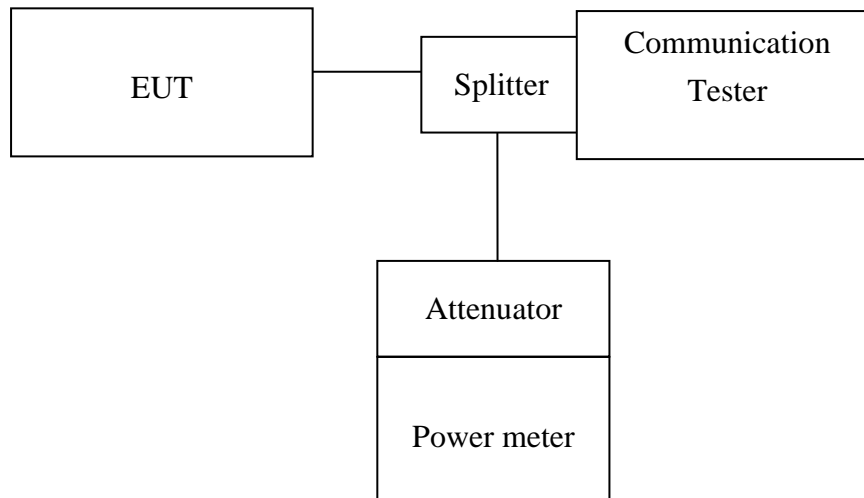
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6. RF CONDUCTED OUTPUT POWER MEASUREMENT

6.1. Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

6.2. Test Set-up



Note: Measurement setup for testing on Antenna connector

6.3. Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

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6.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016
Coaxial Cable 30cm	WOKEN	00100A1F1A1 95C	RF01	12/12/2015	12/11/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18 G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/23/2015	06/22/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

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6.5. Measurement Result

RF Conducted Output Power

GPRS/EDGE (GMSK; 8-PSK) Result:

EUT Mode	Frequency (MHz)	CH	Peak Power (1DN 1UP) Class 8 (dBm)	Average Burst Power (1DN 1UP) Class 8 (dBm)	Peak Power (1DN 2UP) Class 10 (dBm)	Average Burst Power (1DN 2UP) Class 10 (dBm)	Peak Power (1DN 3UP) Class 12 (dBm)	Average Burst Power (1DN 3UP) Class 12 (dBm)	Peak Power (1DN 4UP) Class 12 (dBm)	Average Burst Power (1DN 4UP) Class 12 (dBm)
GPRS 850	824.2	128	32.00	31.70	29.70	29.50	28.20	28.00	27.00	26.80
	836.6	190	31.90	31.70	29.60	29.50	28.20	28.00	27.00	26.70
	848.8	251	31.80	31.60	29.60	29.40	28.20	28.00	26.90	26.70
GPRS 1900	1850.2	512	28.50	28.30	27.10	26.80	25.80	25.60	24.50	24.30
	1880.0	661	28.80	28.50	27.20	27.00	25.70	25.50	24.40	24.20
	1909.8	810	28.90	28.70	26.90	26.70	25.30	25.20	24.00	23.80

Minimum Communications Power Measurement

PCS 1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	28.8	28.6	28.6	28.6	27.4	25.9	24	22	20.1

PCL	9	10	11	12	13	14	15
Output power (dBm)	18.1	16.2	14.2	12.3	10.3	8.4	6.6

Note: The EUT output power was controlled by simulator. Set Communication Tester CMU200 PCL as above, and get the mobile phone output power reading.

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7. EFFECTIVE RADIATED POWER AND EQUIVALENT ISOTROPIC RADIATED POWER MEASUREMENT

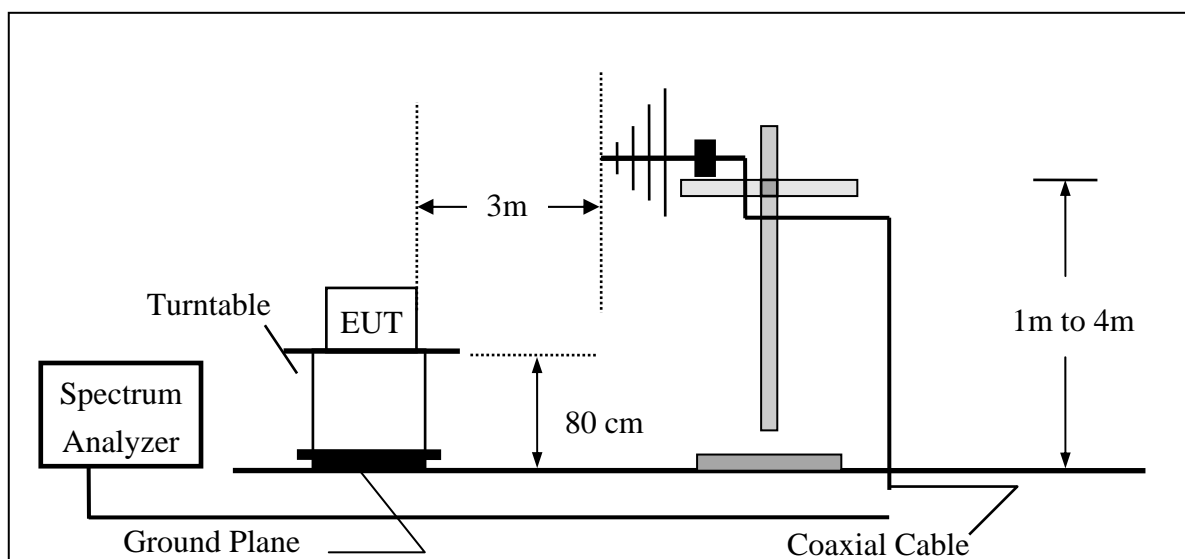
7.1. Standard Applicable

FCC 22.913(a) Mobile station is limited to 7W.

FCC 24.232(b) Mobile station is limited to 2W.

7.2. Test SET-UP

(A) Radiated Power Test Set-Up, Frequency Below 1000MHz



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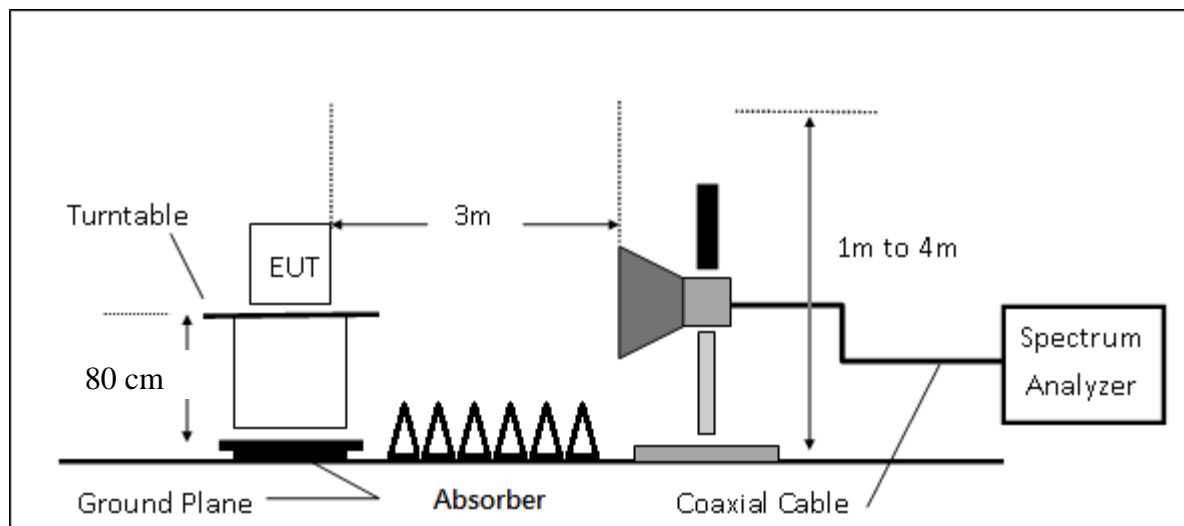
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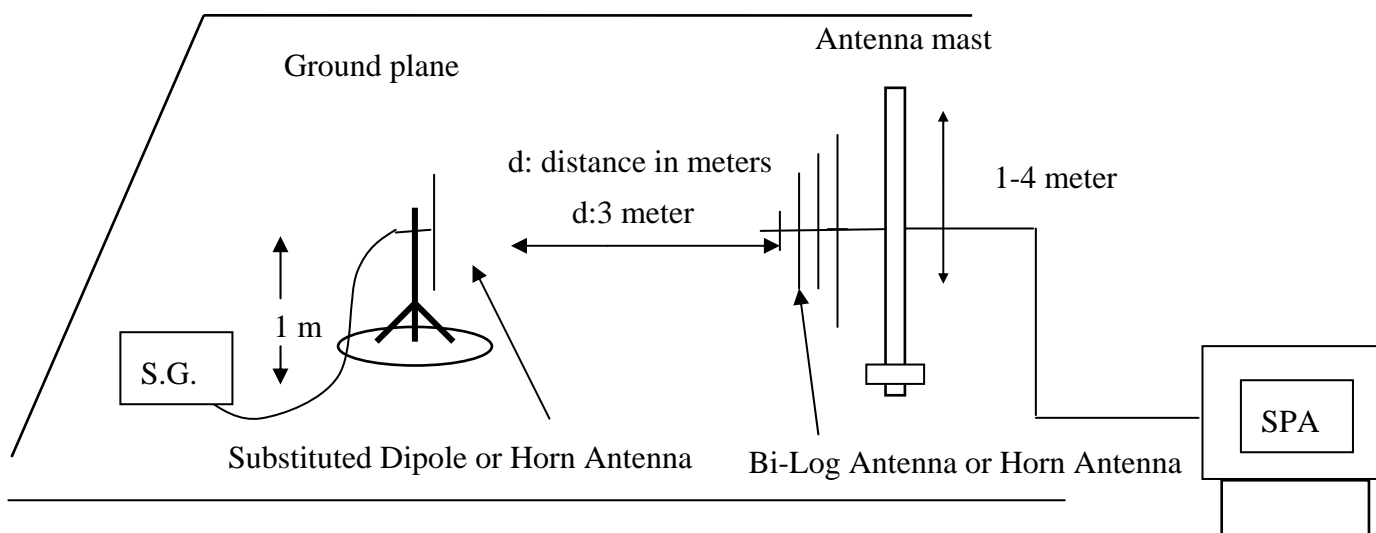
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(B) Radiated Power Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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7.3. Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 971168 D01
2. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
3. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated
4. The testing follows the Measurement Procedure of FCC KDB 971168 D01
5. 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.
6. $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$
7. $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$
8. Spectrum setting:
 - (1) Detector = Peak, marker the highest value of the detector by maximum hold, set RBW wide enough to capture the entire signal of emission, and VBW $> 3 \times RBW$.
 - (2) KDB 971168 D01 is adopted, and the procedure as lists under item 4, Measurement of the Average Power over the Fundamental Signal Bandwidth, is followed to set correspondingly for the acquisition of proper measurement data.

Set frequency = nominal signal center frequency;
 Set span = 2 X occupied BW;
 Set RBW $\approx 1 \sim 5\%$ of the span, not to exceed 1 MHz
 Set VBW = 3 x RBW;
 Select average power (RMS) detector
 Set sweep time and number of measurement points to achieve a minimum of 1 millisecond/pt
 integration time (ex. Point = 601points, then sweep time = $601 \times 10^{-3} = 6s$).

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Activate trace averaging routine over a minimum of 100 sweeps;
Activate marker/span pair and set span = signal or channel bandwidth;
Activate the band/interval power marker function;
Record the band power level;

Record adjusted value as the average signal power level. Then activate the occupied bandwidth measurement function.

The proper adjustment due to limitation of spectrum capability is given compensated to spectrum with conversion factor of $10 \cdot \log(TBW/RBW)$, where TBW is the transmission of UE exceeding the maximum BW UE can extends, and RBW is the resolution BW in UE.

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7.4. Measurement Equipment Used

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016
Loop Antenna	ETS-Lindgren	6502	143303	12/23/2015	12/22/2016
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	10/27/2016
Horn Antenna	ETS-Lindgren	3117	143272	12/16/2015	12/15/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2015	07/23/2016
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U+SUCOFLE X 104	966Rx 30M-3G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	mini 141-12+SUCOFL EX 104	966Rx 18G-40G	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

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7.5. Measurement Result: (Peak) –using option of peak measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	824.2	128	V	22.63	5.49	-3.38	24.74	38.45
			H	19.85	5.49	-3.38	21.96	38.45
	836.6	190	V	23.49	5.47	-3.29	25.67	38.45
			H	20.84	5.47	-3.29	23.02	38.45
	848.8	251	V	25.41	5.45	-3.10	27.76	38.45
			H	23.53	5.45	-3.10	25.88	38.45

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=300 KHz, VBW=1MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dB _i	dB	dBm	dBm
GPRS 1900	1850.2	512	V	15.57	9.59	-5.05	20.11	33.01
			H	24.28	9.59	-5.05	28.82	33.01
	1880.0	661	V	15.51	9.69	-5.15	20.05	33.01
			H	22.97	9.69	-5.15	27.51	33.01
	1909.8	810	V	10.00	9.79	-5.13	14.66	33.01
			H	23.08	9.79	-5.13	27.74	33.01

Remark :

- (1) The RBW,VBW of SPA for frequency RBW=300 KHz, VBW=1MHz

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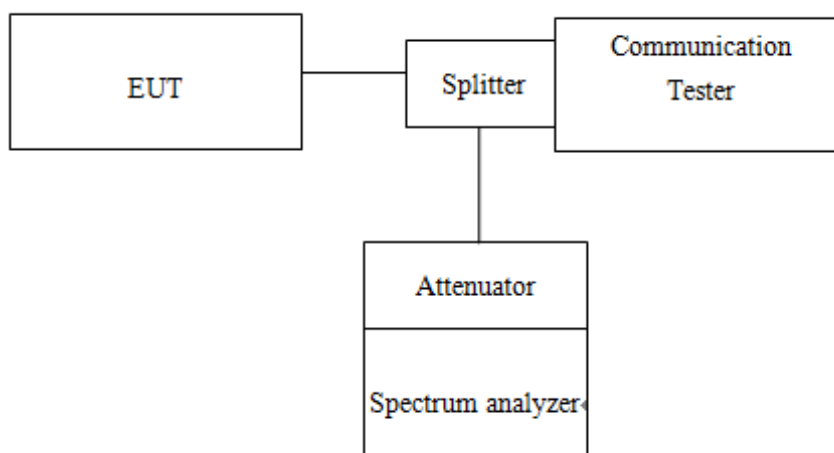
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8. OCCUPIED BANDWIDTH MEASUREMENT

8.1. Standard Applicable

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

8.2. Test Set-up



8.3. Measurement Procedure

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -26dBc display line was placed on the screen (or 26dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

NOTE: For the plot of bandwidth measurement, the marker of the 99% bandwidth is diamond-shape while the marker of the 26dB BW is arrow-mark

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8.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016
Coaxial Cable 30cm	WOKEN	00100A1F1A1 95C	RF01	12/12/2015	12/11/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18 G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/23/2015	06/22/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

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8.5. Measurement Result

99% Bandwidth

Frequency (MHz)	CH	99% Bandwidth (kHz)
		GPRS 850
824.20	128	248.48
836.60	190	246.71
848.80	251	246.66

Frequency (MHz)	CH	99% Bandwidth (kHz)
		GPRS 1900
1850.20	512	244.64
1880.00	661	249.72
1909.80	810	245.66

26dB Bandwidth

Frequency (MHz)	CH	26dB Bandwidth (kHz)
		GPRS 850
824.20	128	316.30
836.60	190	320.50
848.80	251	320.40

Frequency (MHz)	CH	26dB Bandwidth (kHz)
		GPRS 1900
1850.20	512	311.30
1880.00	661	320.60
1909.80	810	306.10

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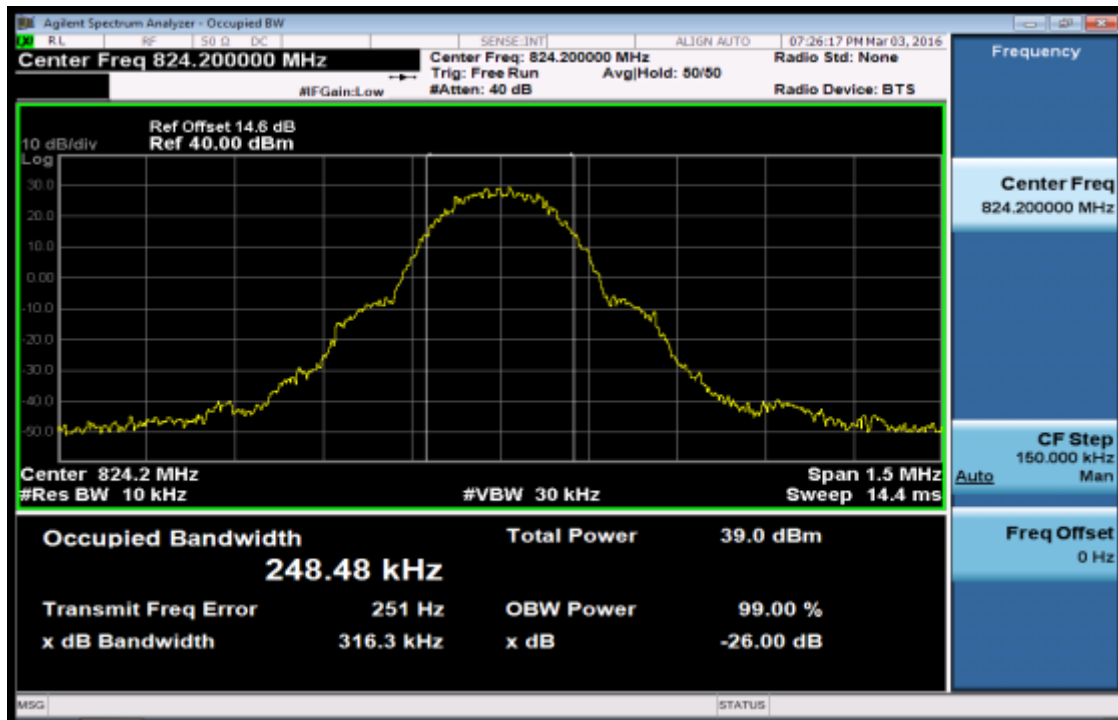
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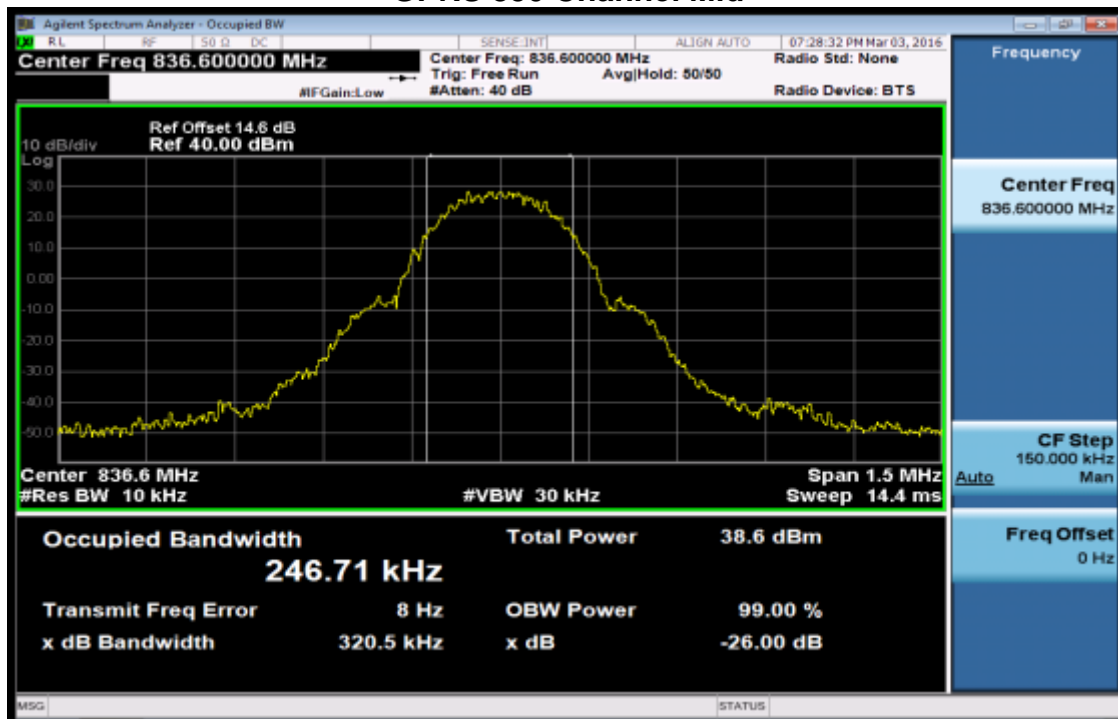
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99% Bandwidth Test Data

GPRS 850 Channel Low



GPRS 850 Channel Mid



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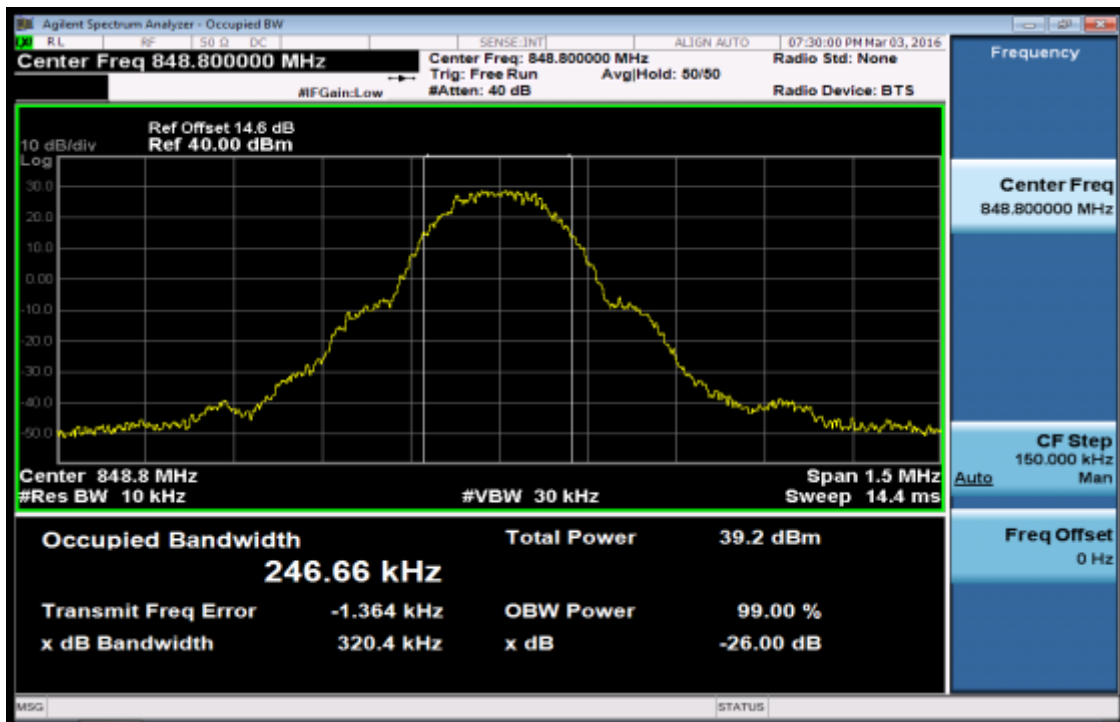
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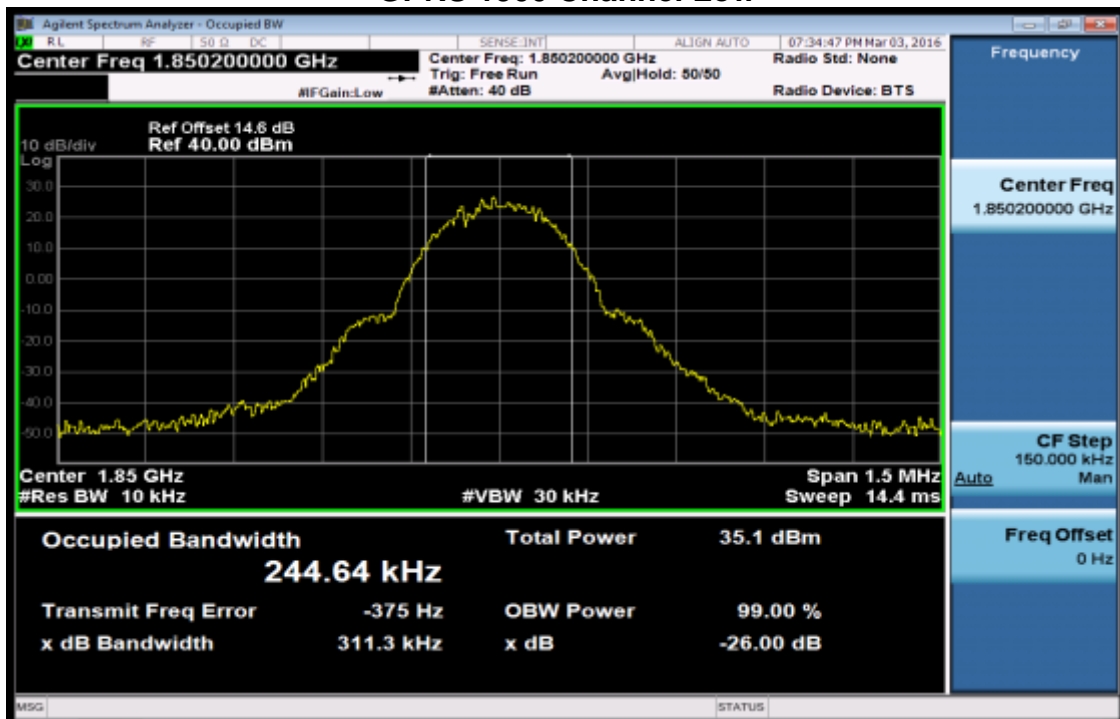
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GPRS 850 Channel High



GPRS 1900 Channel Low



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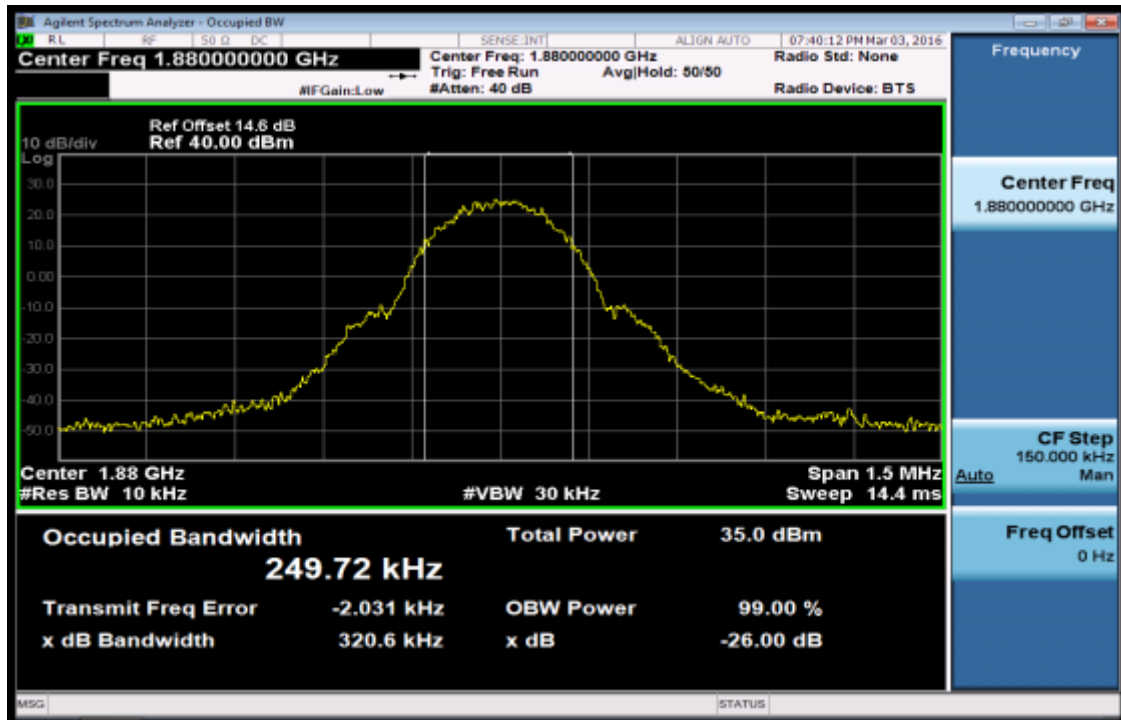
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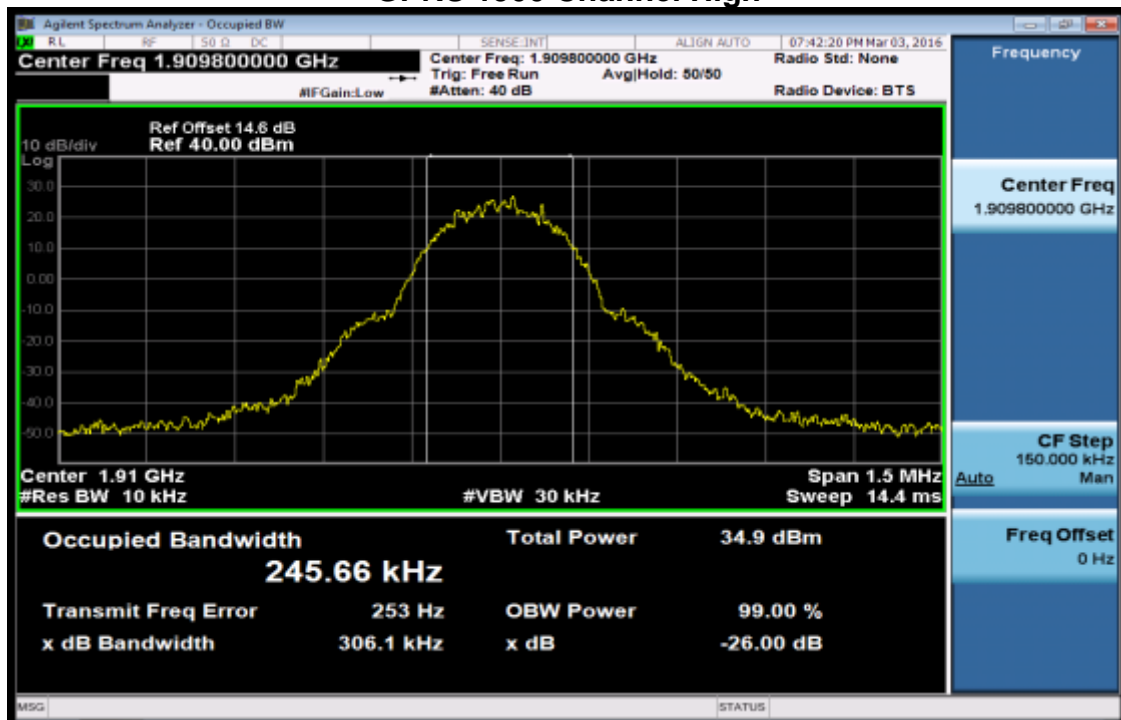
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GPRS 1900 Channel Mid



GPRS 1900 Channel High



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9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1. Standard Applicable

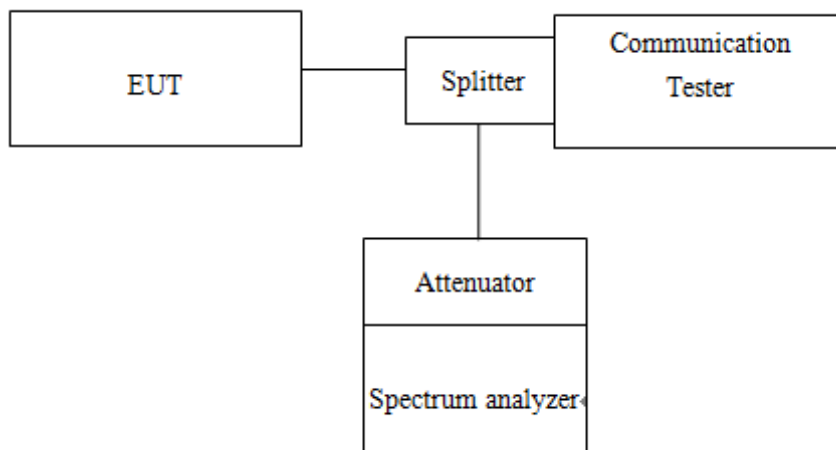
FCC §22.917(a), §24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

Band Edge Measurement:

FCC §27.53(h)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

9.2. Test SET-UP



9.3. Measurement Procedure

Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.

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3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW \geq 1% EBW.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

9.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/23/2015	06/22/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

9.5. Measurement Result:

Refer to next pages.

NOTE: The occurrence of the spike on the conducted emission is the signal of the fundamental emission.

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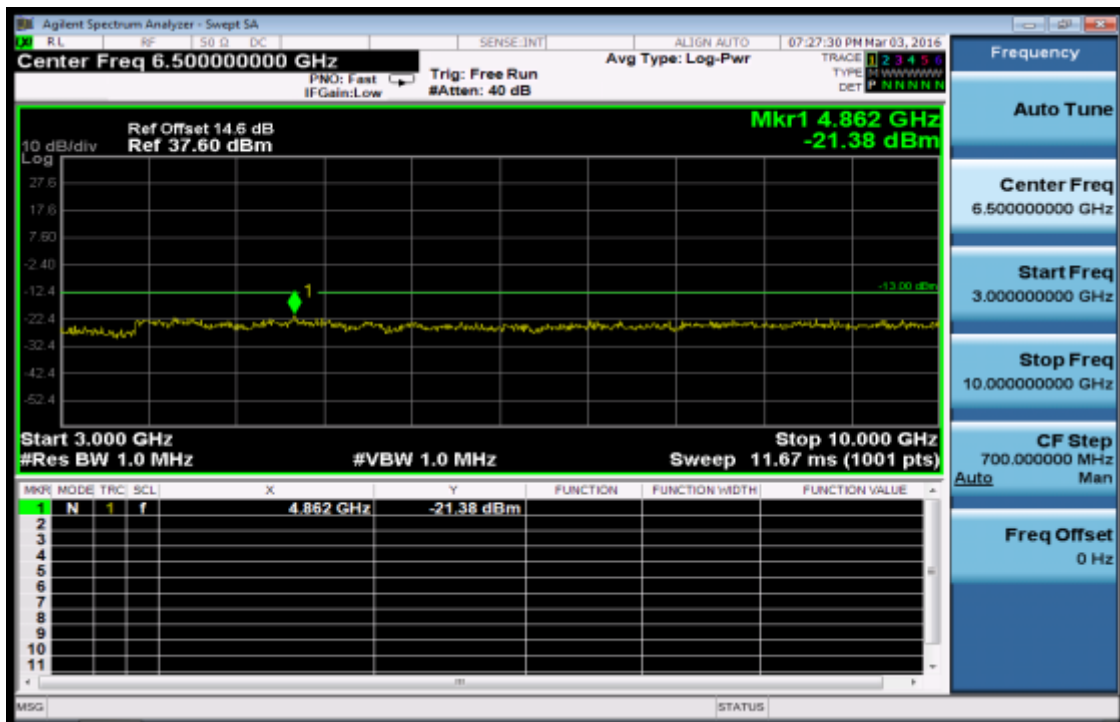
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Out of Band emission at antenna terminals – GPRS 850 Channel Lowest



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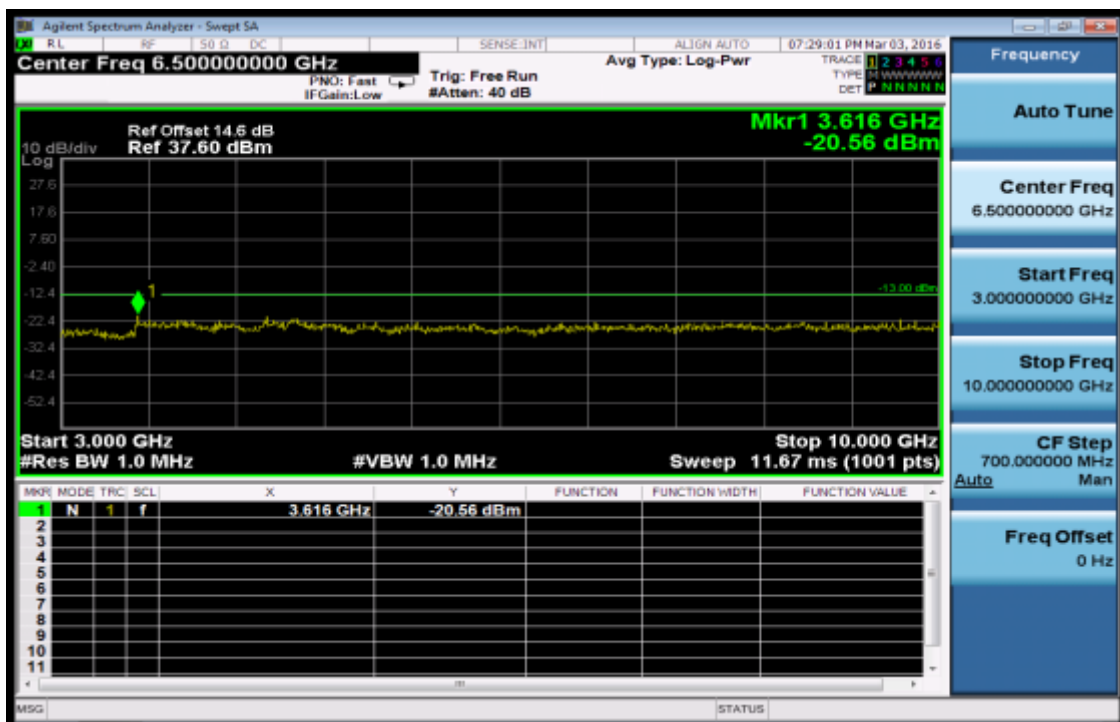
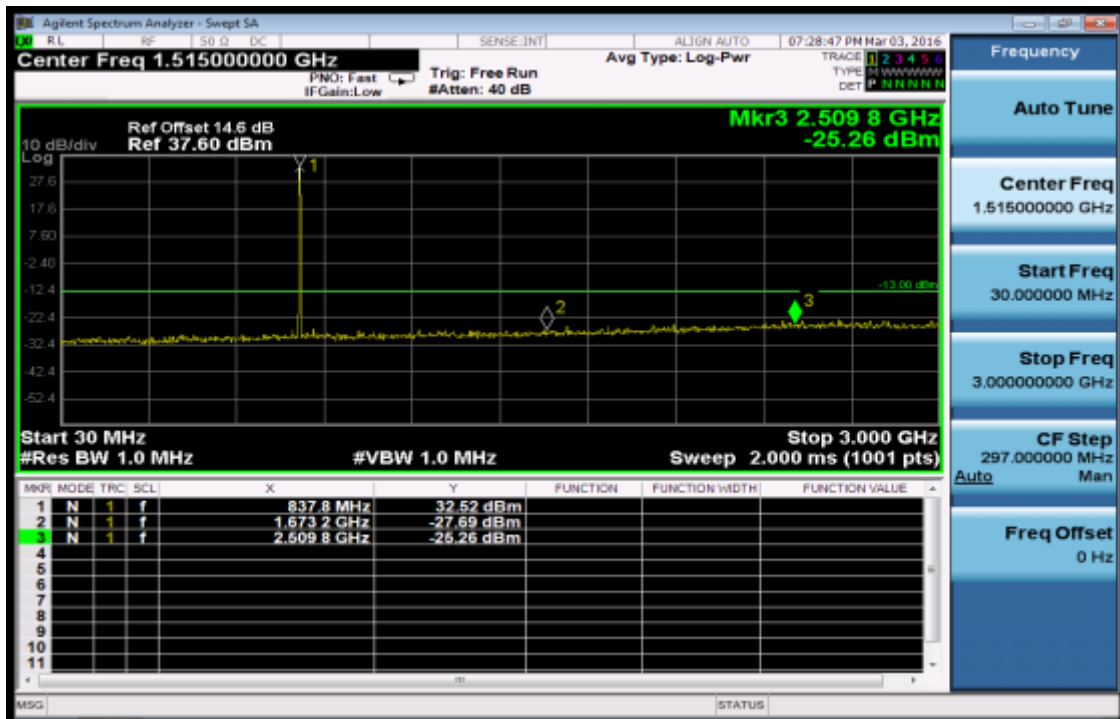
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f (886-2) 2298-0488

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Out of Band emission at antenna terminals – GPRS 850 Channel Mid



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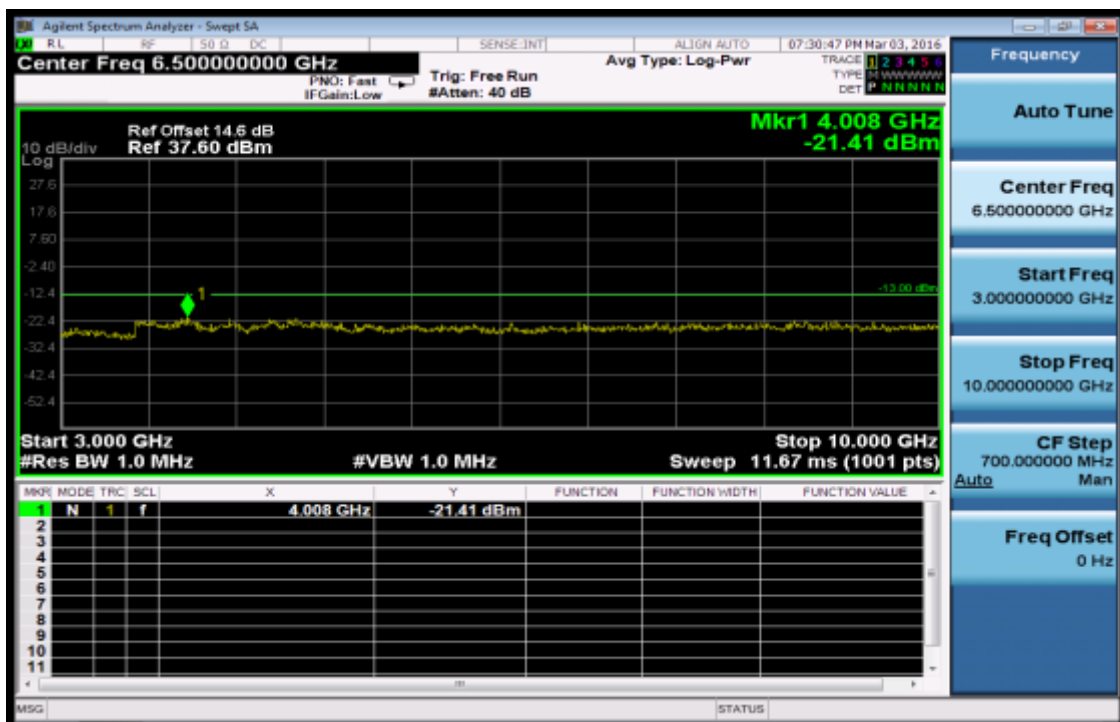
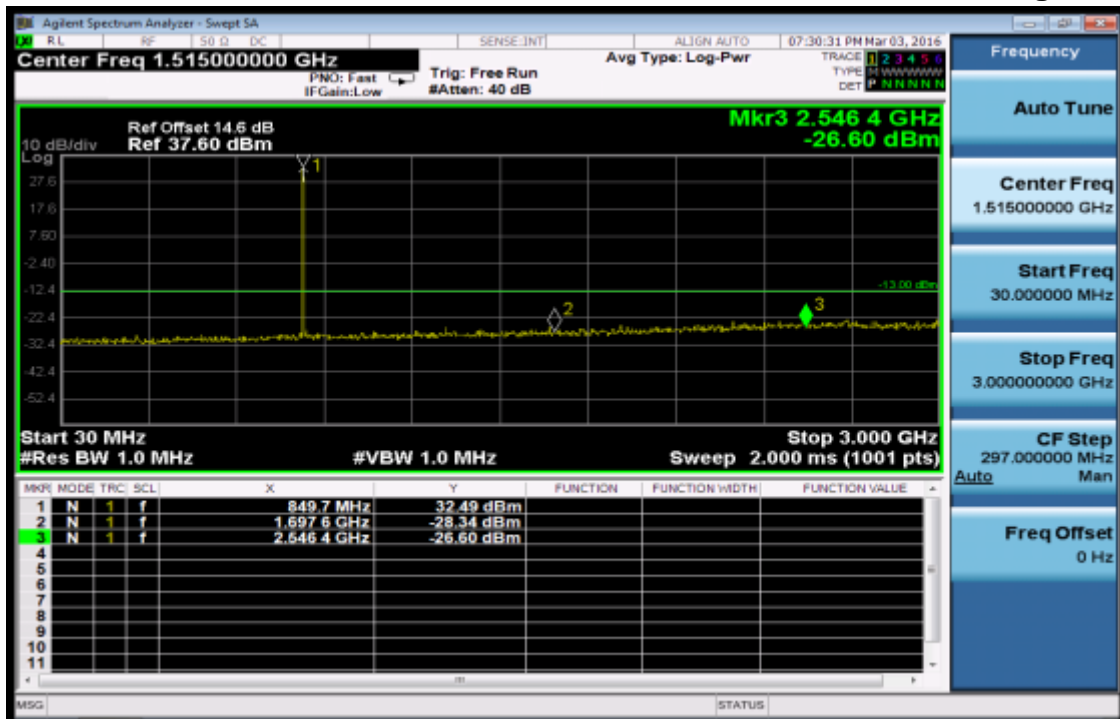
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Out of Band emission at antenna terminals – GPRS 850 Channel Highest



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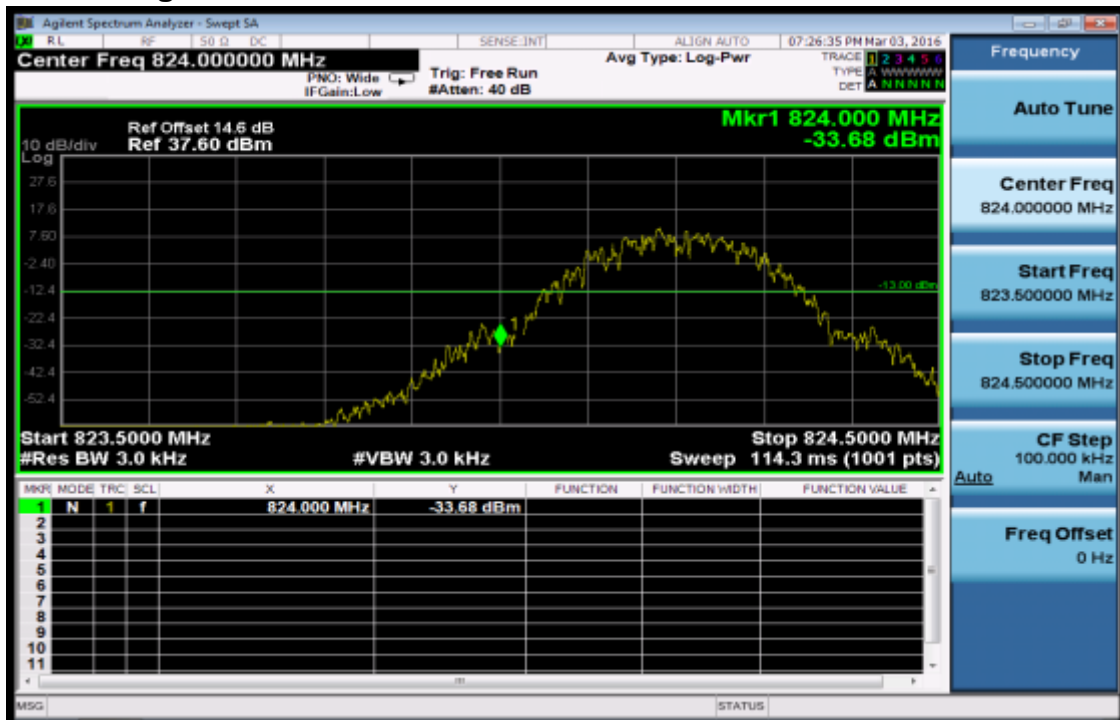
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Band edge emission at antenna terminals – GPRS 850 Channel Lowest



Band edge emission at antenna terminals – GPRS 850 Channel Highest



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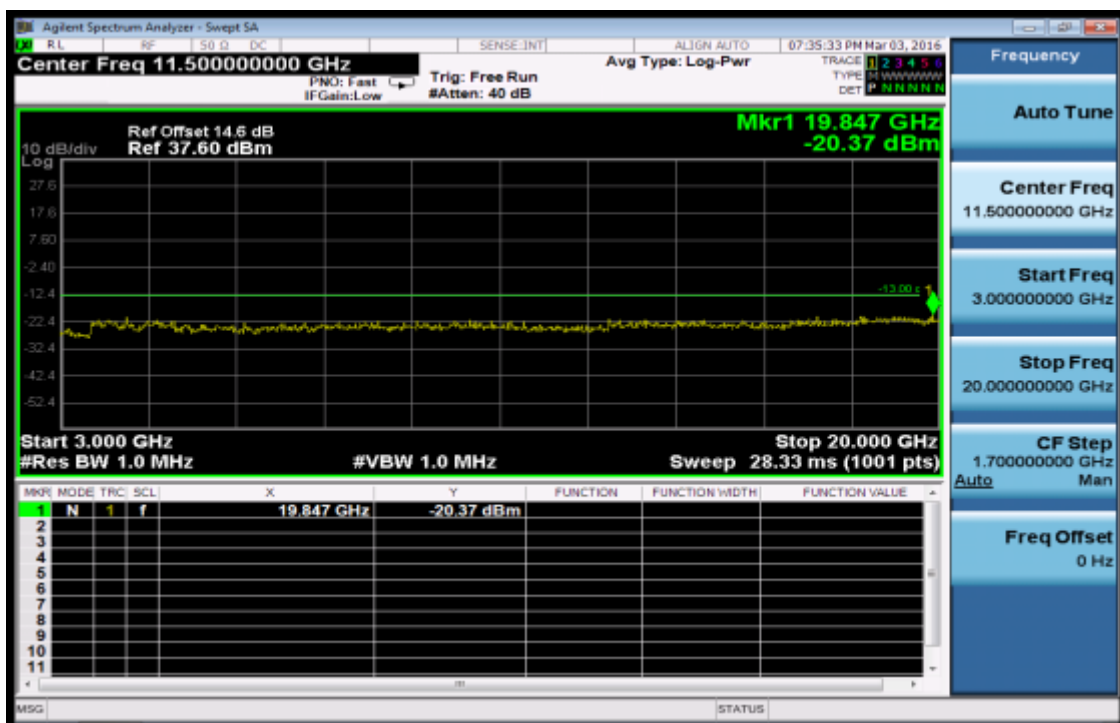
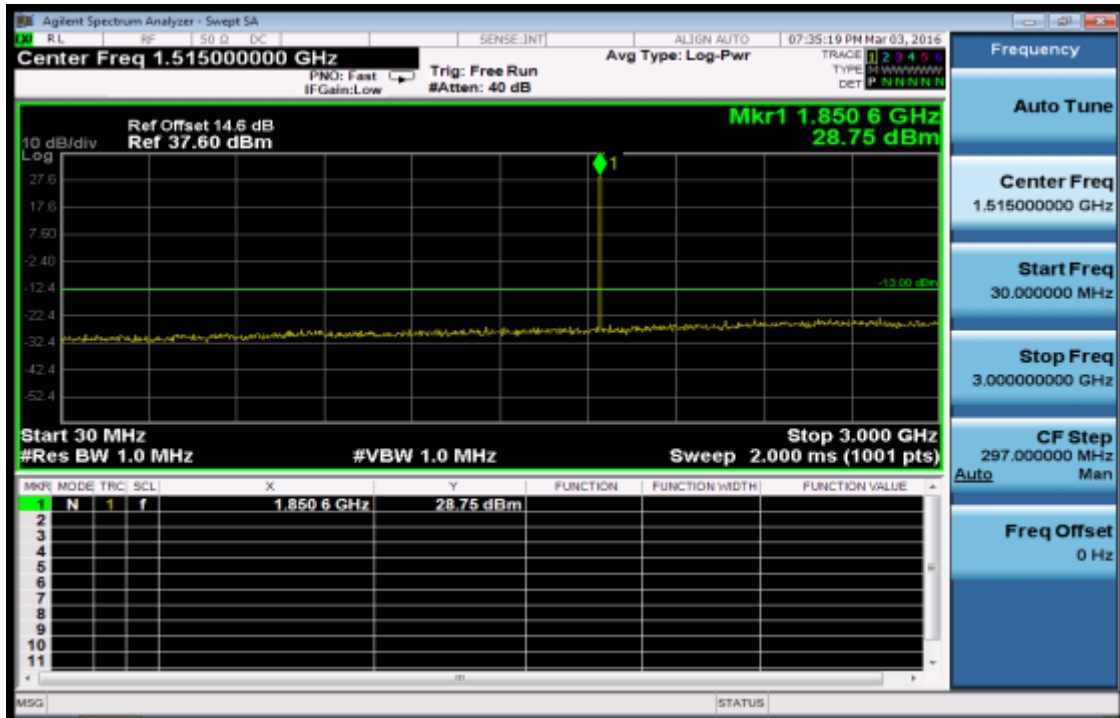
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Out of Band emission at antenna terminals – GPRS 1900 Channel Lowest



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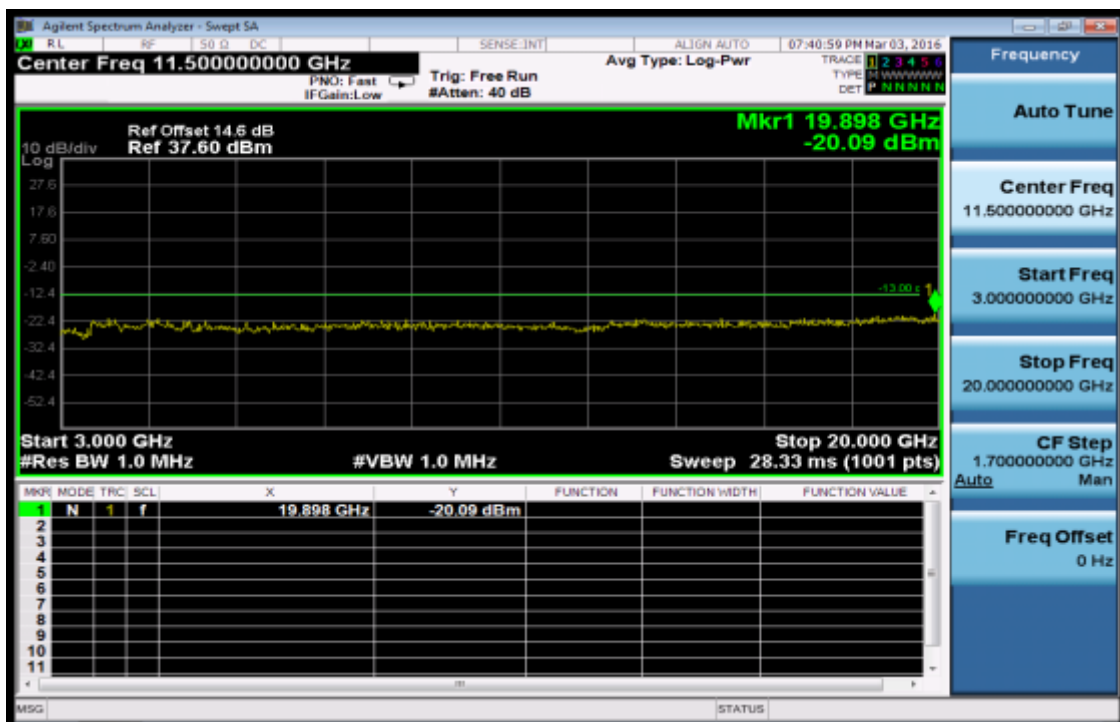
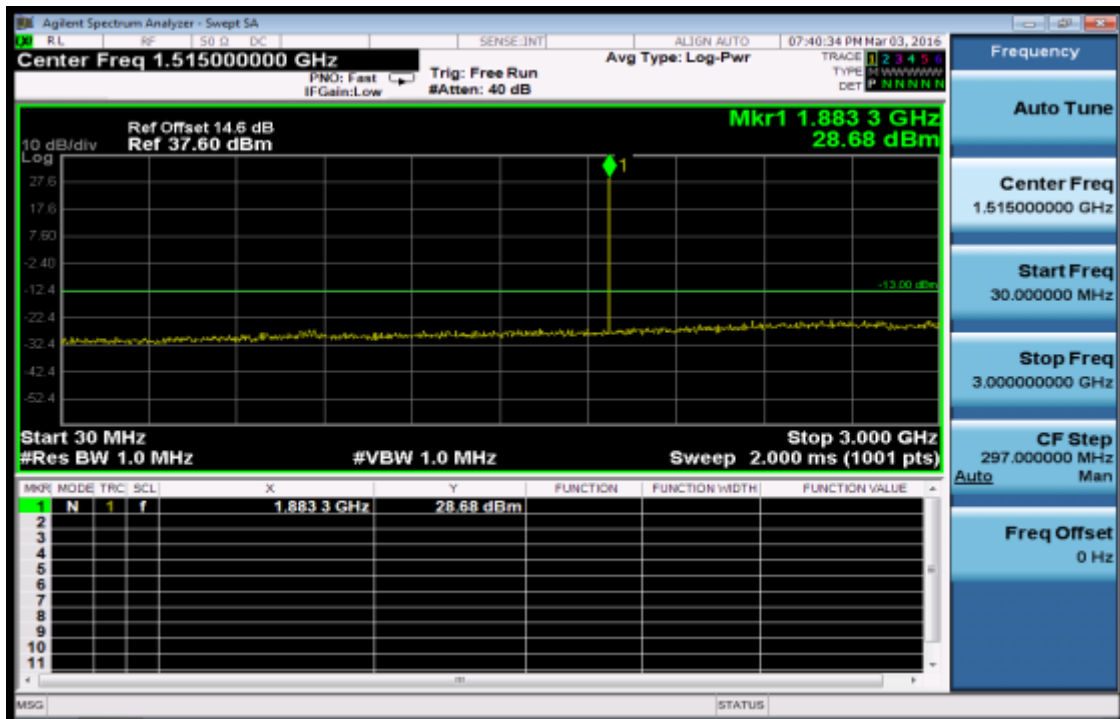
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Out of Band emission at antenna terminals – GPRS 1900 Channel Mid



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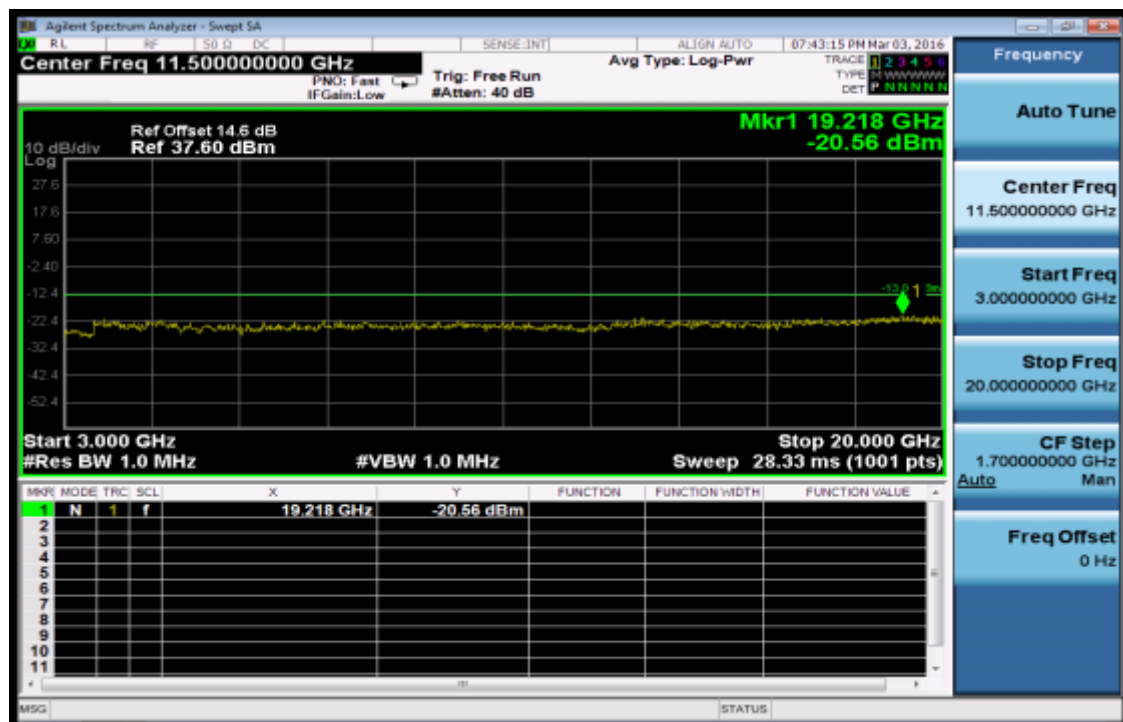
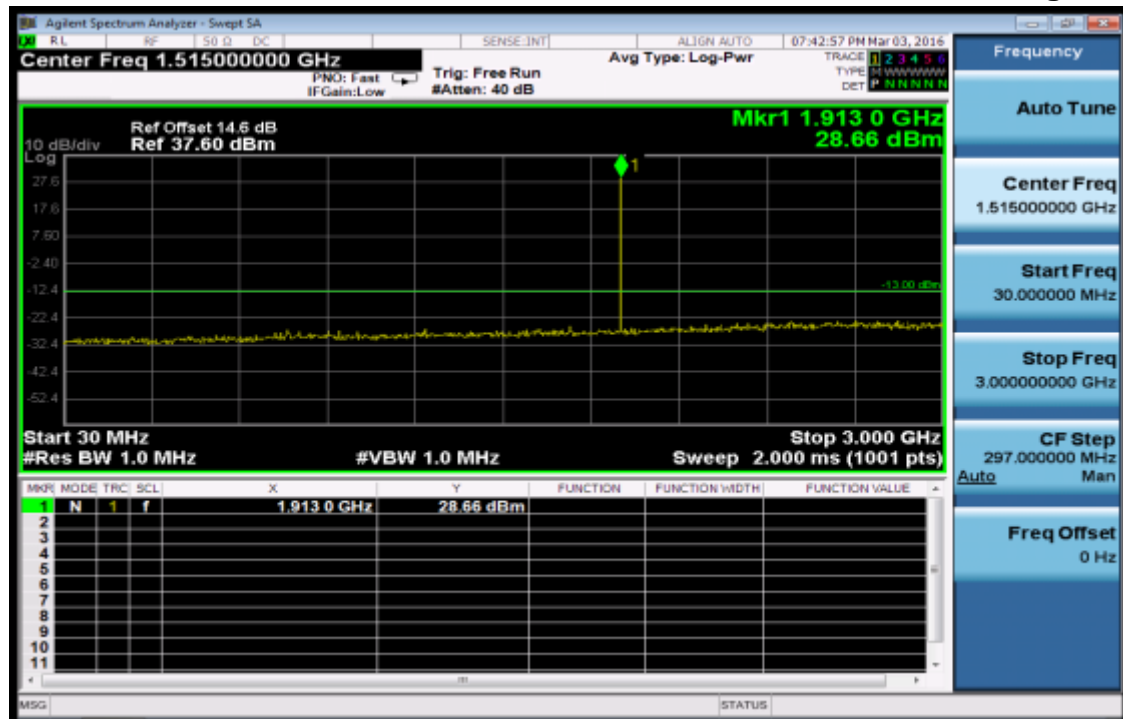
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Out of Band emission at antenna terminals – GPRS 1900 Channel Highest



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Band edge emission at antenna terminals – GPRS 1900 Channel Lowest



Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

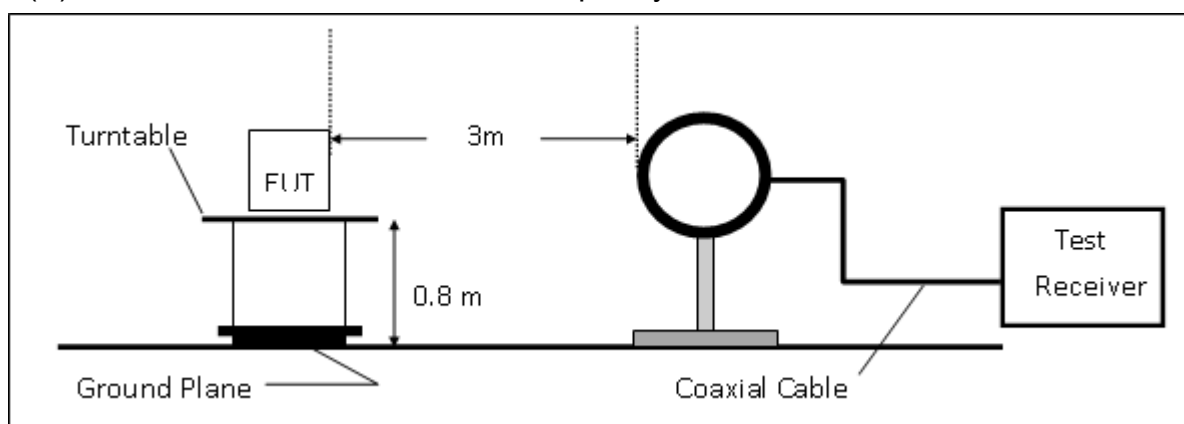
10.1. Standard Applicable

According to FCC §2.1053,

FCC §22.917(a), §24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

10.2. EUT Setup

(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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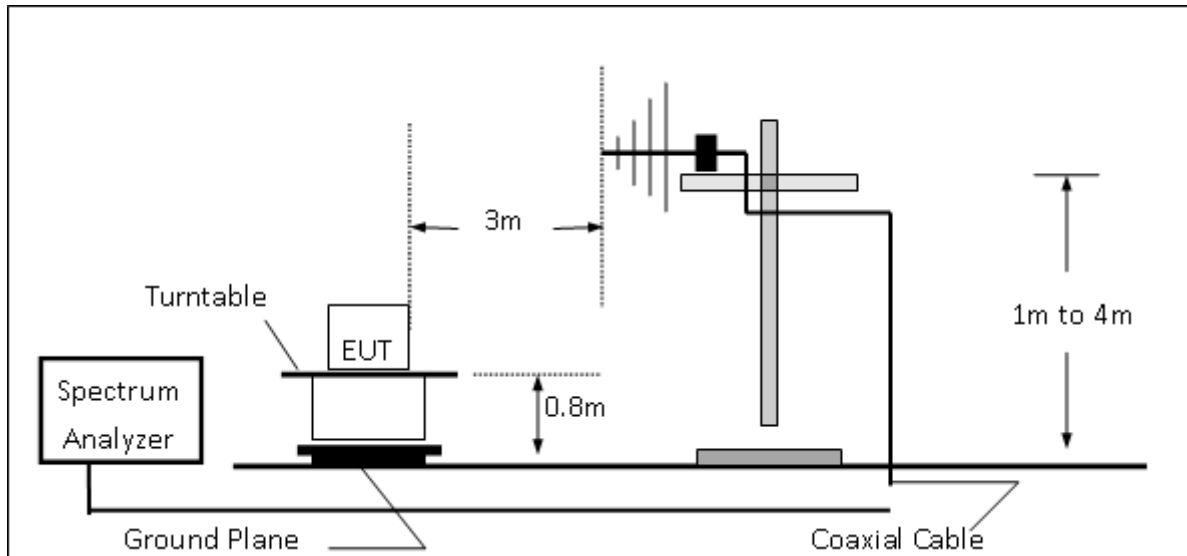
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f (886-2) 2298-0488

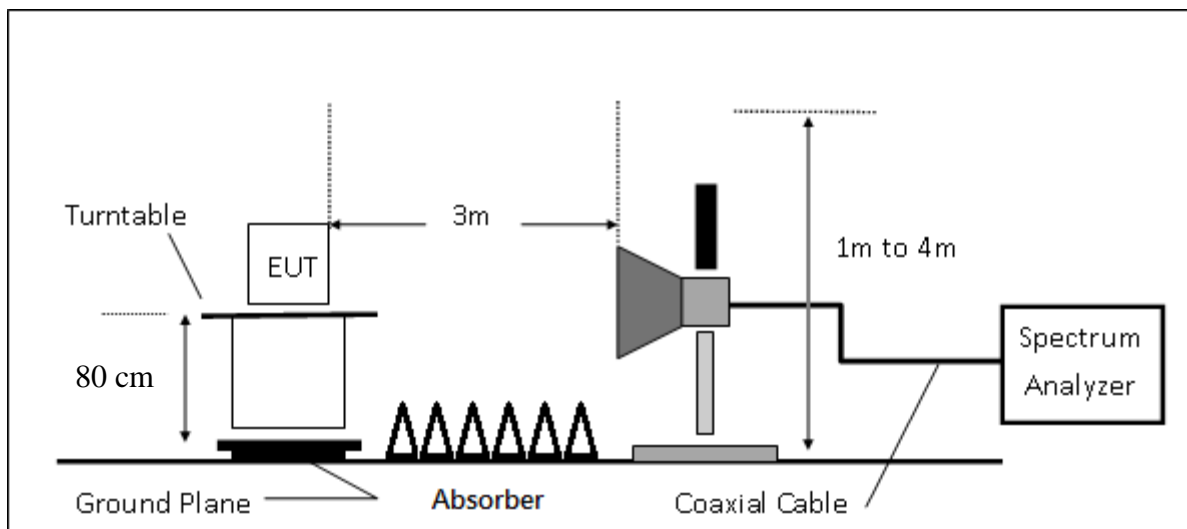
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(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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10.3. Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP= S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

EIRP (dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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10.4. Measurement Equipment Used:

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016
Loop Antenna	ETS-Lindgren	6502	143303	12/23/2015	12/22/2016
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	10/27/2016
Horn Antenna	ETS-Lindgren	3117	143272	12/16/2015	12/15/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2015	07/23/2016
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U+SUCOFL EX 104	966Rx 30M-3G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	mini 141-12+SUCOF LEX 104	966Rx 18G-40G	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

Note: N.C.R refers to Not Calibrated Required

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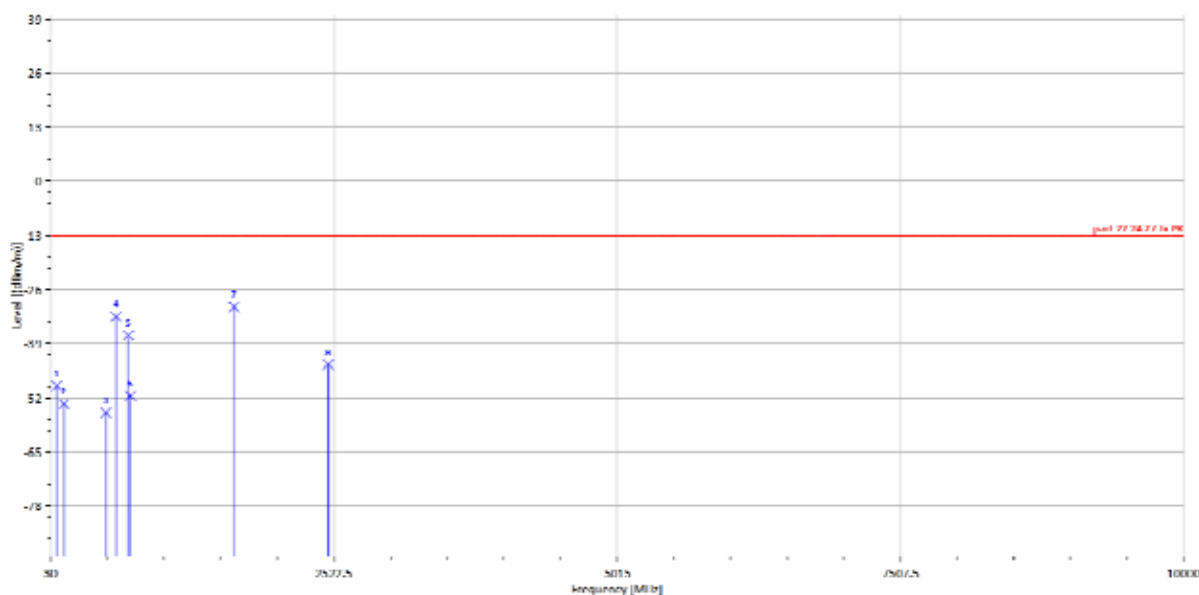
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10.5. Measurement Result :

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode :	GPRS_850	Test Date :	2016/3/2
Fundamental Frequency :	824.2 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
83.44	S	-49.09	-46.30	-1.71	-1.08	-13.01	-36.08
146.59	S	-53.45	-51.90	-0.09	-1.45	-13.01	-40.44
517.43	S	-55.53	-57.27	4.25	-2.50	-13.01	-42.52
604.87	S	-32.49	-34.18	4.74	-3.05	-13.01	-19.48
714.99	S	-36.95	-39.45	5.46	-2.97	-13.01	-23.94
731.19	S	-51.50	-53.79	5.46	-3.17	-13.01	-38.49
1642.74	H	-30.13	-32.15	6.74	-4.71	-13.01	-17.12
2472.45	H	-43.92	-46.31	8.23	-5.84	-13.01	-30.91

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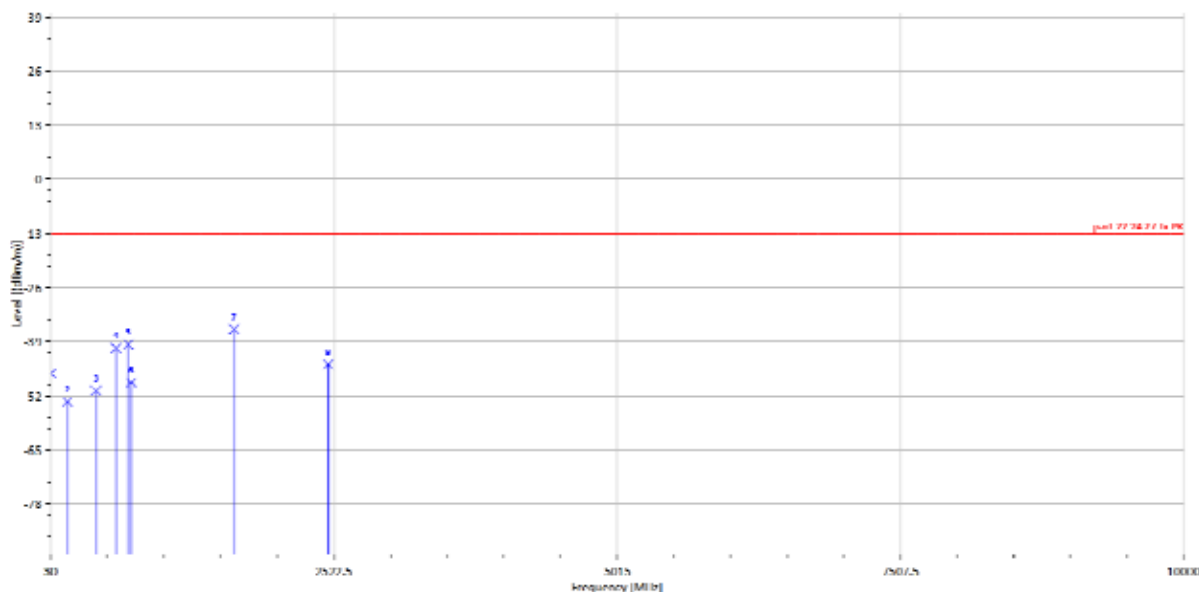
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Operation Mode : GPRS_850
Fundamental Frequency : 824.2 MHz
Operation Band : Tx CH Low
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Horizontal



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
33.24	S	-46.55	-26.29	-19.59	-0.68	-13.01	-33.54
178.98	S	-53.41	-55.38	3.46	-1.50	-13.01	-40.40
428.36	S	-50.74	-52.16	3.90	-2.48	-13.01	-37.73
604.87	S	-40.52	-42.21	4.74	-3.05	-13.01	-27.51
714.99	S	-39.61	-42.11	5.46	-2.97	-13.01	-26.60
739.28	S	-48.80	-50.88	5.46	-3.38	-13.01	-35.79
1642.74	H	-35.99	-38.01	6.74	-4.71	-13.01	-22.98
2472.45	H	-44.39	-46.78	8.23	-5.84	-13.01	-31.38

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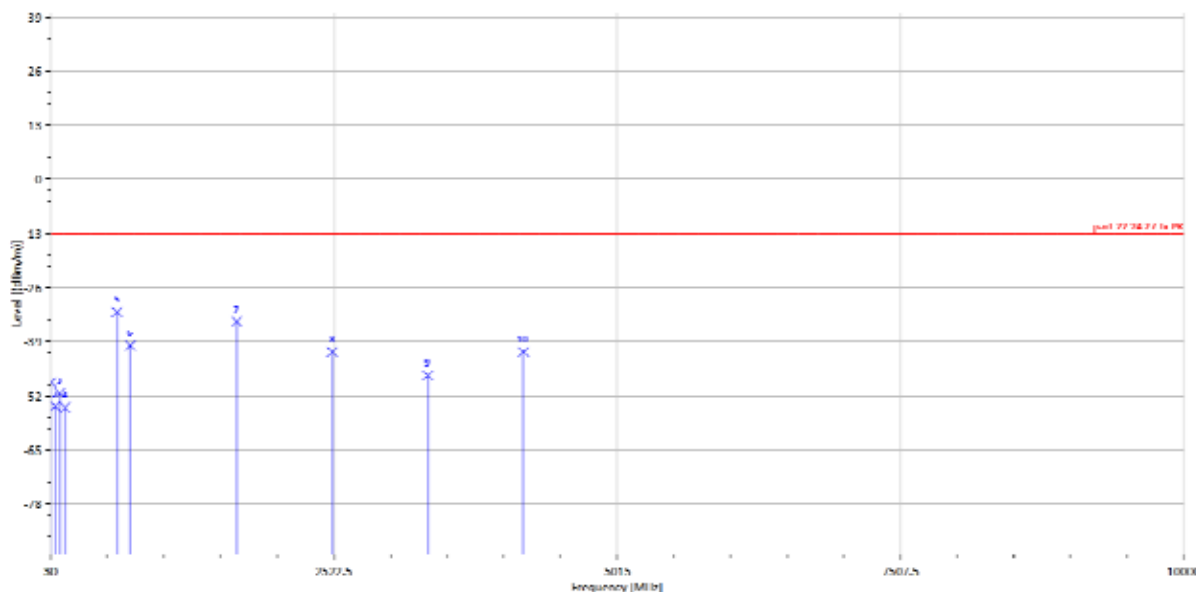
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Operation Mode : GPRS_850
Fundamental Frequency : 836.6 MHz
Operation Band : Tx CH Mid
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
34.86	S	-48.77	-29.88	-18.18	-0.71	-13.01	-35.76
70.48	S	-54.50	-51.75	-1.73	-1.02	-13.01	-41.49
109.35	S	-51.35	-46.73	-3.39	-1.23	-13.01	-38.34
157.93	S	-54.83	-54.54	1.22	-1.51	-13.01	-41.82
612.97	S	-31.85	-33.72	4.77	-2.90	-13.01	-18.84
731.19	S	-39.89	-42.18	5.46	-3.17	-13.01	-26.88
1666.11	H	-34.18	-36.23	6.81	-4.76	-13.01	-21.17
2507.51	H	-41.40	-43.77	8.26	-5.89	-13.01	-28.39
3348.92	H	-47.08	-50.00	9.85	-6.92	-13.01	-34.07
4190.32	H	-41.41	-44.05	10.23	-7.59	-13.01	-28.40

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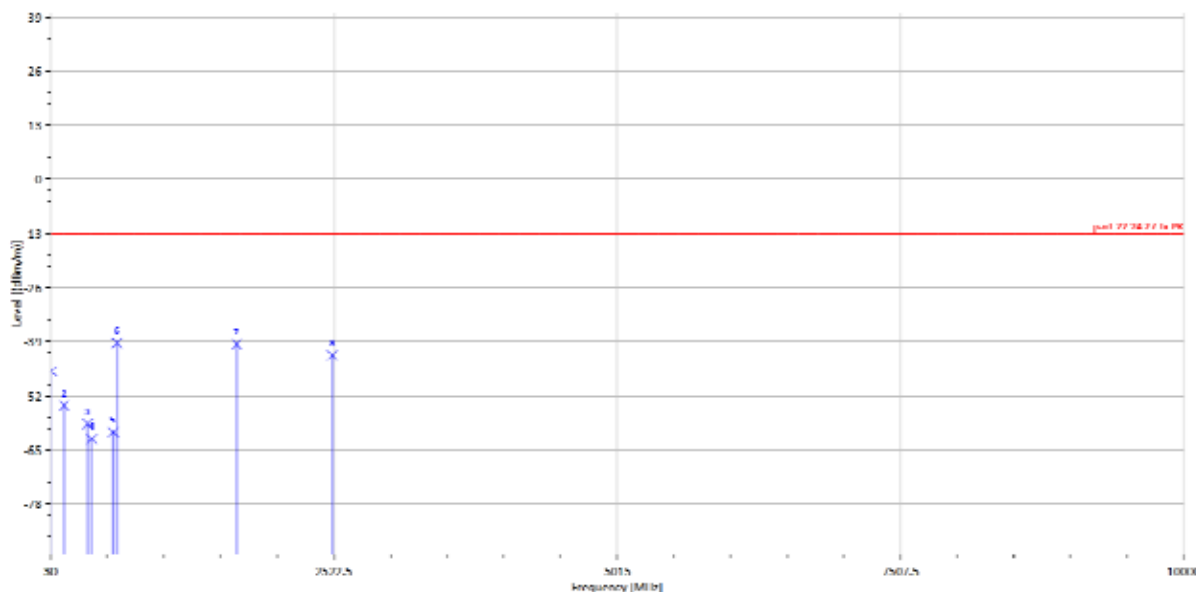
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Member of SGS Group

Operation Mode : GPRS_850
Fundamental Frequency : 836.6 MHz
Operation Band : Tx CH Mid
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Horizontal



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
34.86	S	-46.03	-27.14	-18.18	-0.71	-13.01	-33.02
148.21	S	-54.31	-53.04	0.13	-1.41	-13.01	-41.30
355.49	S	-58.70	-60.19	3.73	-2.24	-13.01	-45.69
391.12	S	-62.35	-63.70	3.63	-2.28	-13.01	-49.34
580.58	S	-60.68	-62.53	4.55	-2.69	-13.01	-47.67
612.97	S	-39.26	-41.14	4.77	-2.90	-13.01	-26.25
1666.11	H	-39.57	-41.62	6.81	-4.76	-13.01	-26.56
2507.51	H	-42.28	-44.65	8.26	-5.89	-13.01	-29.27

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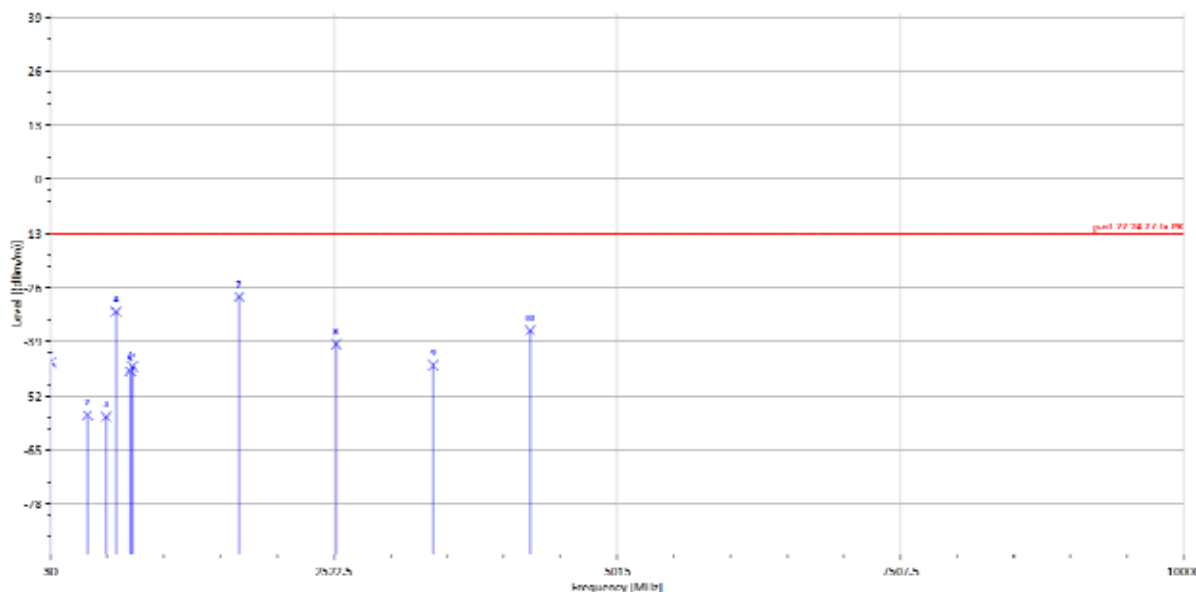
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Operation Mode : GPRS_850
Fundamental Frequency : 848.8 MHz
Operation Band : Tx CH High
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
31.62	S	-43.87	-22.22	-20.99	-0.66	-13.01	-30.86
355.49	S	-56.58	-58.07	3.73	-2.24	-13.01	-43.57
519.05	S	-57.03	-58.50	4.25	-2.78	-13.01	-44.02
604.87	S	-31.77	-33.46	4.74	-3.05	-13.01	-18.76
731.19	S	-46.06	-48.35	5.46	-3.17	-13.01	-33.05
749.00	S	-44.95	-46.99	5.46	-3.42	-13.01	-31.94
1689.48	H	-28.20	-30.30	6.89	-4.80	-13.01	-15.19
2542.57	H	-39.52	-41.94	8.33	-5.91	-13.01	-26.51
3395.66	H	-44.66	-47.68	9.94	-6.92	-13.01	-31.65
4248.75	H	-36.29	-38.91	10.25	-7.63	-13.01	-23.28

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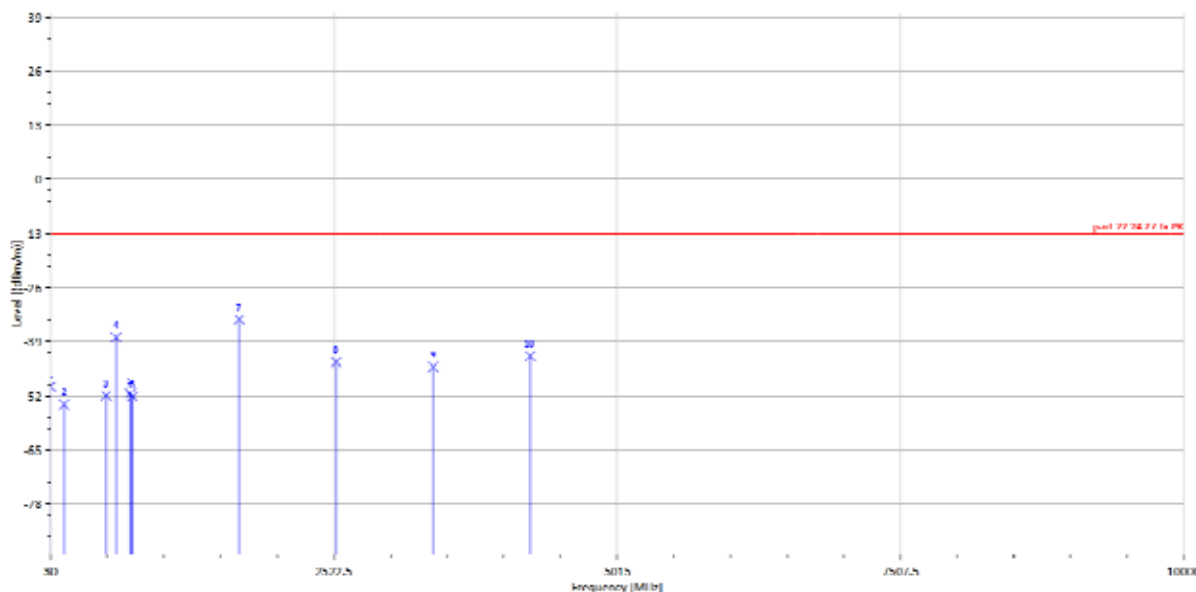
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Operation Mode : GPRS_850
Fundamental Frequency : 848.8 MHz
Operation Band : Tx CH High
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Horizontal



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBd	Loss dB	dBm	dB
31.62	S	-49.81	-28.15	-20.99	-0.66	-13.01	-36.80
148.21	S	-54.05	-52.78	0.13	-1.41	-13.01	-41.04
519.05	S	-51.92	-53.39	4.25	-2.78	-13.01	-38.91
604.87	S	-37.98	-39.67	4.74	-3.05	-13.01	-24.97
731.19	S	-51.40	-53.68	5.46	-3.17	-13.01	-38.39
747.38	S	-52.21	-54.54	5.46	-3.13	-13.01	-39.20
1689.48	H	-33.69	-35.79	6.89	-4.80	-13.01	-20.68
2542.57	H	-43.84	-46.26	8.33	-5.91	-13.01	-30.83
3395.66	H	-45.04	-48.06	9.94	-6.92	-13.01	-32.03
4248.75	H	-42.43	-45.05	10.25	-7.63	-13.01	-29.42

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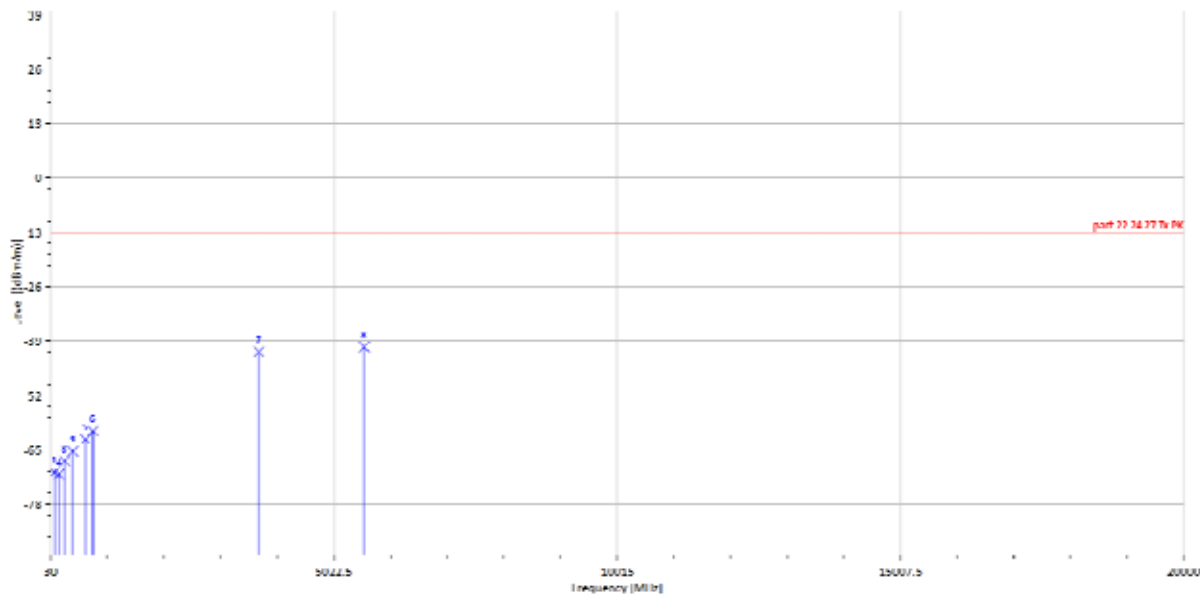
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Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode :	GPRS_1900	Test Date :	2016/3/2
Fundamental Frequency :	1850.2 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
99.63	S	-70.40	-68.37	-0.86	-1.17	-13.01	-57.39
175.74	S	-70.76	-74.44	5.29	-1.61	-13.01	-57.75
277.76	S	-67.64	-71.35	5.68	-1.98	-13.01	-54.63
418.65	S	-65.33	-68.76	5.95	-2.51	-13.01	-52.32
645.36	S	-62.49	-66.53	7.05	-3.02	-13.01	-49.48
774.91	S	-60.49	-65.19	7.64	-2.94	-13.01	-47.48
3699.50	H	-41.53	-46.68	12.30	-7.15	-13.01	-28.52
5557.60	H	-40.36	-44.32	12.62	-8.67	-13.01	-27.35

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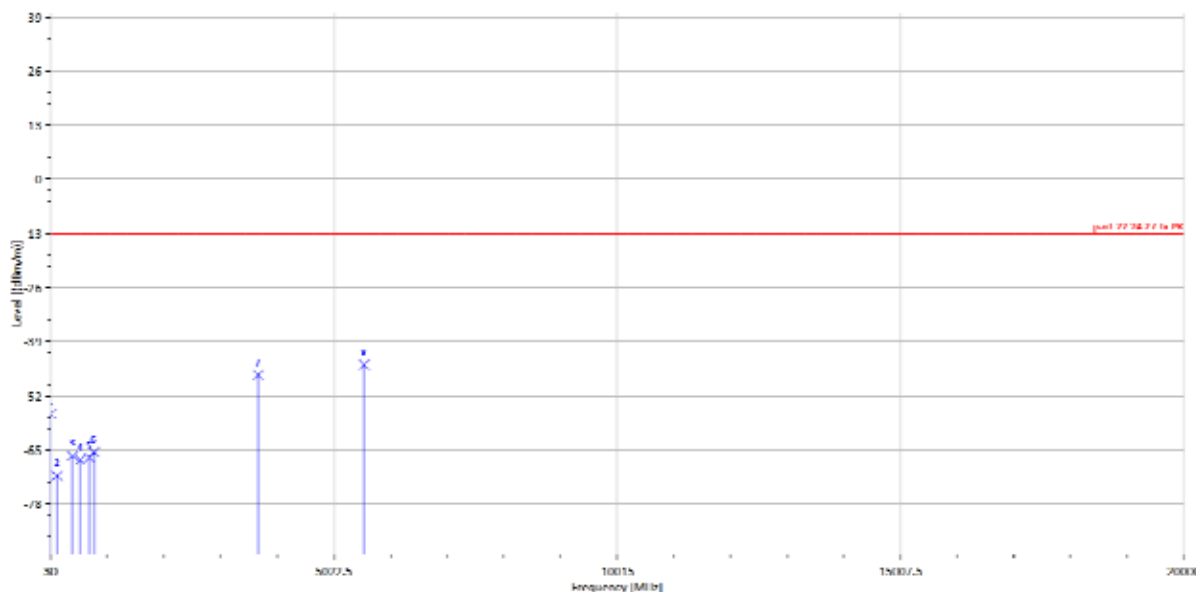
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Operation Mode :	GPRS_1900	Test Date :	2016/3/2
Fundamental Frequency :	1850.2 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
31.62	S	-56.32	-36.81	-18.84	-0.66	-13.01	-43.31
141.74	S	-71.18	-71.21	1.38	-1.34	-13.01	-58.17
415.41	S	-66.37	-70.00	5.91	-2.29	-13.01	-53.36
548.20	S	-67.38	-71.31	6.42	-2.49	-13.01	-54.37
716.61	S	-66.85	-71.24	7.61	-3.22	-13.01	-53.84
792.72	S	-65.49	-69.88	7.66	-3.27	-13.01	-52.48
3687.81	H	-46.95	-52.08	12.30	-7.17	-13.01	-33.94
5557.60	H	-44.50	-48.46	12.62	-8.67	-13.01	-31.49

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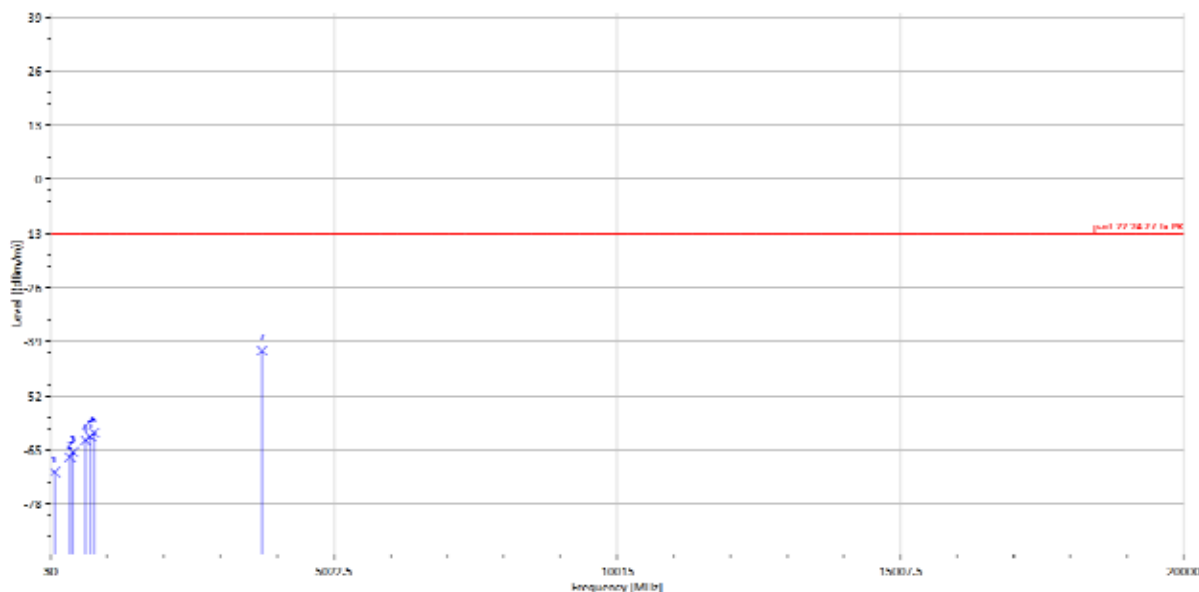
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Operation Mode :	GPRS_1900	Test Date :	2016/3/2
Fundamental Frequency :	1880.0 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
99.63	S	-70.29	-68.26	-0.86	-1.17	-13.01	-57.28
370.07	S	-66.71	-70.33	5.84	-2.22	-13.01	-53.70
421.89	S	-65.48	-69.13	5.98	-2.33	-13.01	-52.47
643.74	S	-62.65	-66.71	7.04	-2.99	-13.01	-49.64
734.42	S	-61.83	-66.42	7.61	-3.03	-13.01	-48.82
791.10	S	-60.79	-65.00	7.66	-3.46	-13.01	-47.78
3757.93	H	-41.11	-46.21	12.30	-7.20	-13.01	-28.10

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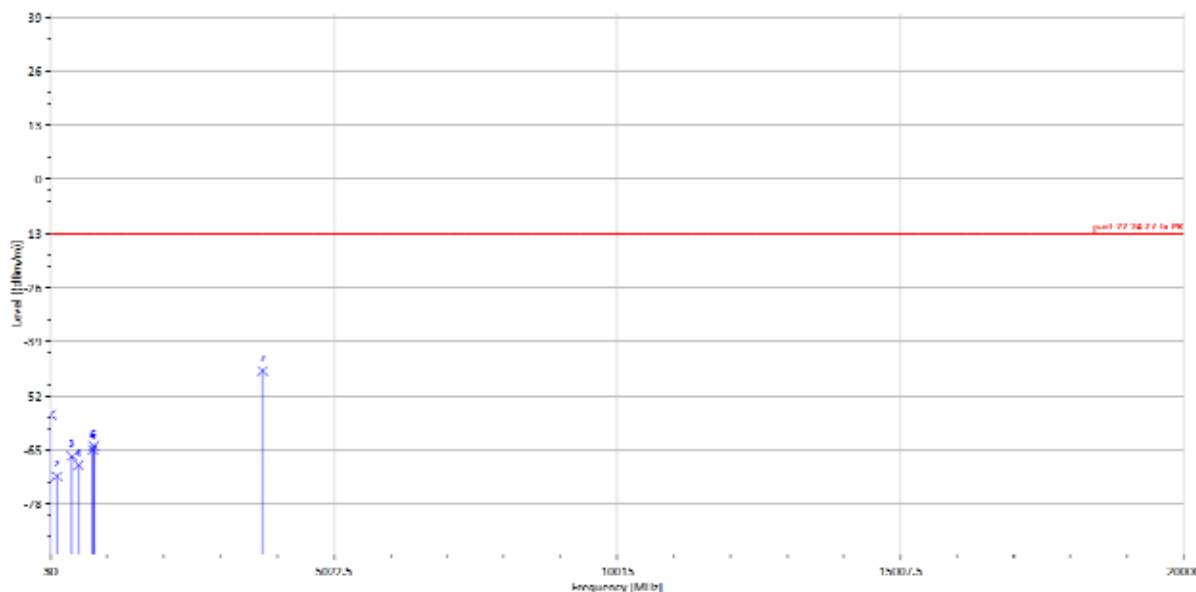
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Operation Mode :	GPRS_1900	Test Date :	2016/3/2
Fundamental Frequency :	1880.0 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
31.62	S	-56.48	-36.98	-18.84	-0.66	-13.01	-43.47
140.12	S	-71.28	-71.04	1.15	-1.39	-13.01	-58.27
407.31	S	-66.52	-69.89	5.83	-2.45	-13.01	-53.51
519.05	S	-68.64	-72.26	6.40	-2.78	-13.01	-55.63
774.91	S	-64.88	-69.58	7.64	-2.94	-13.01	-51.87
792.72	S	-64.04	-68.43	7.66	-3.27	-13.01	-51.03
3769.62	H	-45.97	-51.05	12.30	-7.22	-13.01	-32.96

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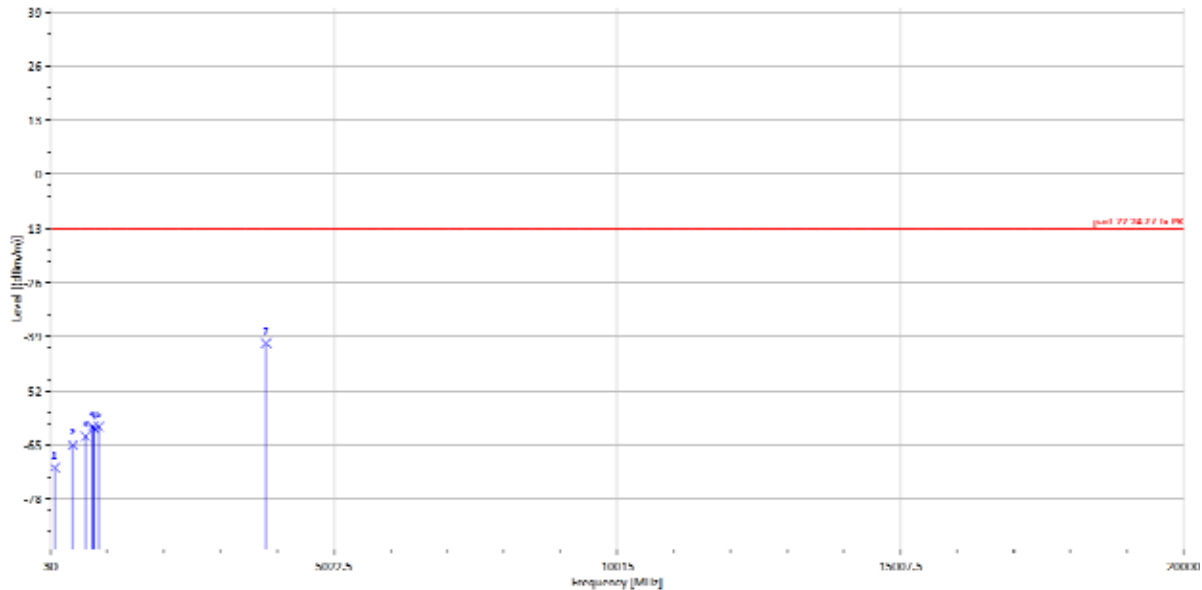
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Operation Mode : GPRS_1900
Fundamental Frequency : 1909.8 MHz
Operation Band : Tx CH High
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
101.25	S	-70.41	-68.29	-0.94	-1.18	-13.01	-57.40
421.89	S	-64.97	-68.62	5.98	-2.33	-13.01	-51.96
648.60	S	-63.00	-67.07	7.06	-2.99	-13.01	-49.99
773.29	S	-60.54	-65.11	7.64	-3.06	-13.01	-47.53
791.10	S	-61.07	-65.28	7.66	-3.46	-13.01	-48.06
875.31	S	-60.58	-64.89	7.70	-3.39	-13.01	-47.57
3828.05	H	-40.54	-45.58	12.30	-7.27	-13.01	-27.53

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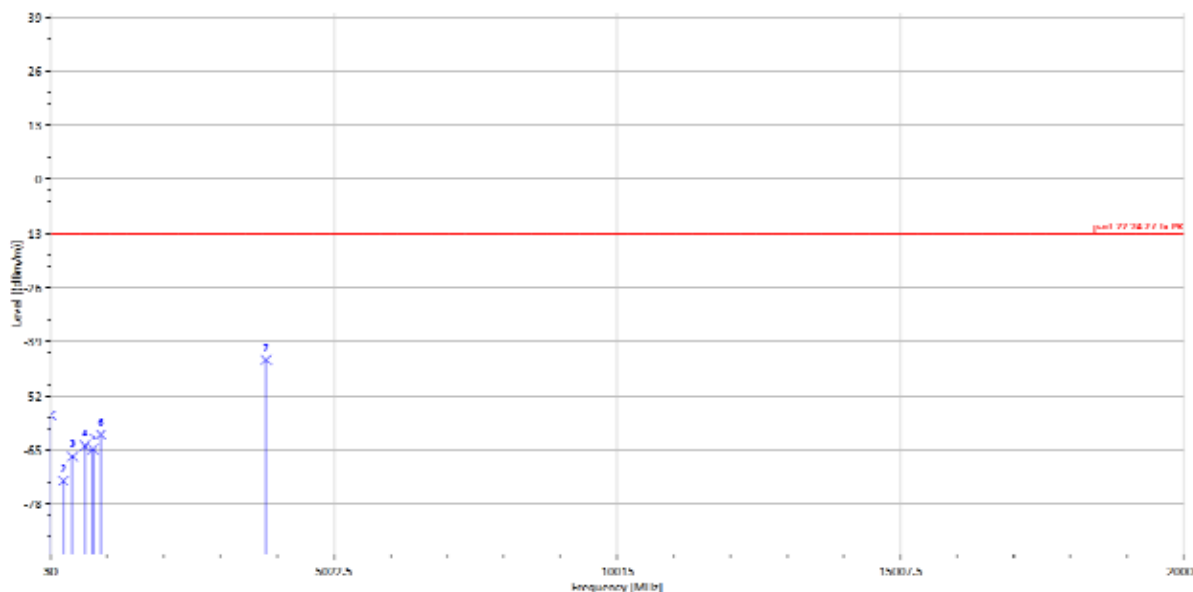
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Operation Mode : GPRS_1900
Fundamental Frequency : 1909.8 MHz
Operation Band : Tx CH High
EUT Pol. : H

Test Date : 2016/3/2
Temp. / Humi. : 22.7deg_C/57RH
Test Engineer : Pony
Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Output Level dBm	Gain dBi	Loss dB	dBm	dB
31.62	S	-56.65	-37.15	-18.84	-0.66	-13.01	-43.64
253.47	S	-72.44	-75.66	5.04	-1.82	-13.01	-59.43
413.79	S	-66.57	-70.21	5.90	-2.26	-13.01	-53.56
637.26	S	-63.98	-68.00	7.02	-3.00	-13.01	-50.97
776.53	S	-64.75	-69.30	7.64	-3.09	-13.01	-51.74
914.17	S	-61.26	-65.51	7.81	-3.56	-13.01	-48.25
3828.05	H	-43.38	-48.41	12.30	-7.27	-13.01	-30.37

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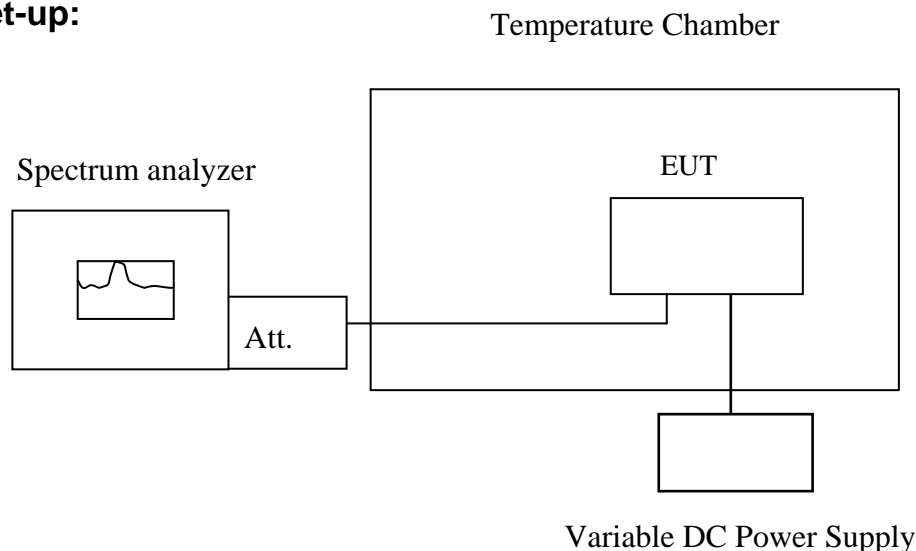
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11. FREQUENCY STABILITY MEASUREMENT

11.1. Standard Applicable:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

11.2. Test Set-up:



Note: Measurement setup for testing on Antenna connector.

11.3. Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25 °C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

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11.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016
Coaxial Cable 30cm	WOKEN	00100A1F1A1 95C	RF01	12/12/2015	12/11/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18 G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/23/2015	06/22/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

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11.5. Measurement Result:

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
4.2	20	836599995	-2	2091
3.7	20	836599997	0	2091
3.5	20	836599999	2	2091
3.4 (End point)	20	836599999	2	2091

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
3.7	50	836600009	12	2091
3.7	40	836600007	10	2091
3.7	30	836600008	11	2091
3.7	20	836599997	0	2091
3.7	10	836600005	8	2091
3.7	0	836599997	0	2091
3.7	-10	836599998	1	2091
3.7	-20	836600000	3	2091
3.7	-30	836599996	-1	2091

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FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
4.2	20	1879999999	2	4700
3.7	20	1879999997	0	4700
3.5	20	1879999996	-1	4700
3.4 (End point)	20	1879999996	-1	4700

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
3.7	50	1880000008	11	4700
3.7	40	1880000006	9	4700
3.7	30	1880000004	7	4700
3.7	20	1879999997	0	4700
3.7	10	1879999999	2	4700
3.7	0	1879999997	0	4700
3.7	-10	1879999995	-2	4700
3.7	-20	1879999996	-1	4700
3.7	-30	1879999999	2	4700

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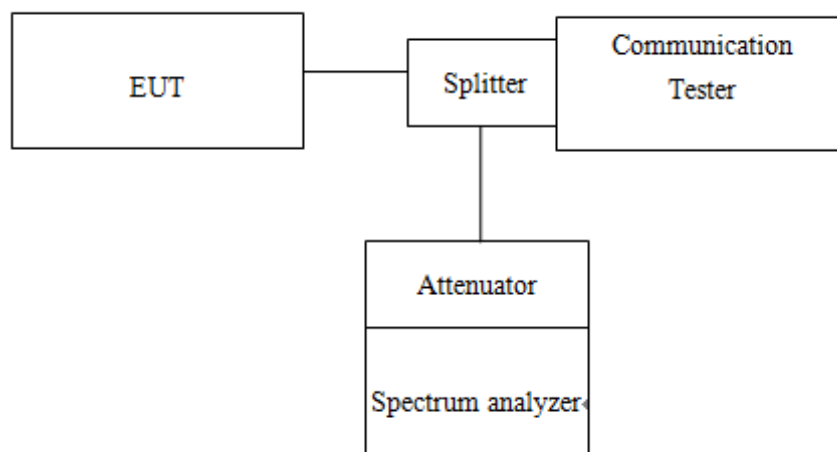
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12. PEAK TO AVERAGE RATIO

12.1. Standard Applicable

The peak-to-average ration (PAR) of the transmission may not exceed 13dB.

12.2. Test SET-UP



12.3. Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth \geq signal's occupied bandwidth; & internal = 1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

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12.4. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016
Coaxial Cable 30cm	WOKEN	00100A1F1A1 95C	RF01	12/12/2015	12/11/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18 G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/23/2015	06/22/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/27/2015	05/26/2016

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台灣檢驗科技股份有限公司

No.134, WuKung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803/新北市五股區新北產業園區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

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12.5. Measurement Result

Tabular Results:

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)
		GPRS
1850.20	512	10.02
1880.00	661	8.31
1909.80	810	10.01

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No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

t (886-2) 2299-3279

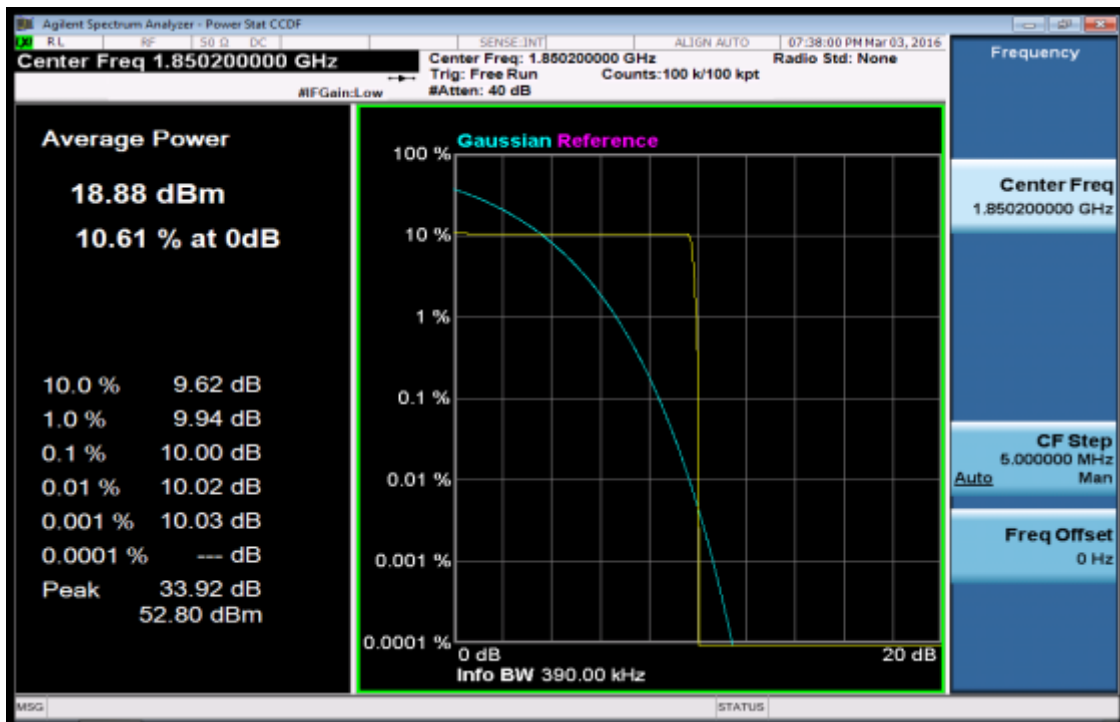
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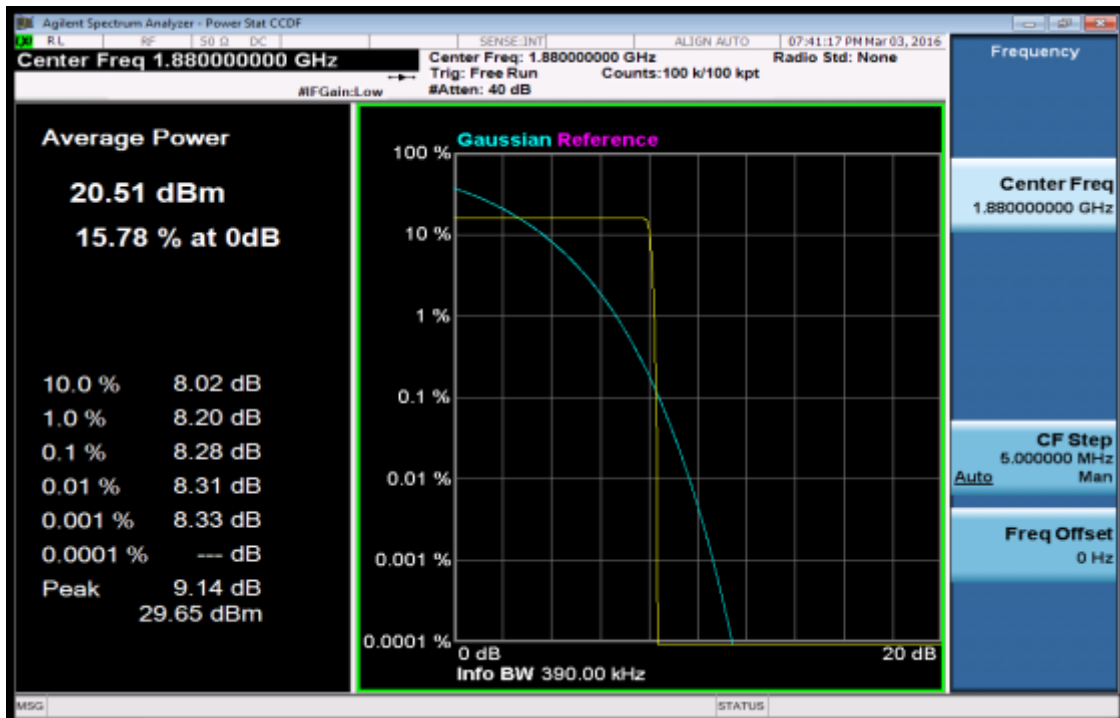
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Measurement Results:

GPRS 1900 Channel Low



GPRS 1900 Channel Mid



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No.134, WuKungRoad, NewTaipeiIndustrialPark, WukuDistrict, NewTaipeiCity, Taiwan24803/新北市五股區新北產業園區五工路 134 號

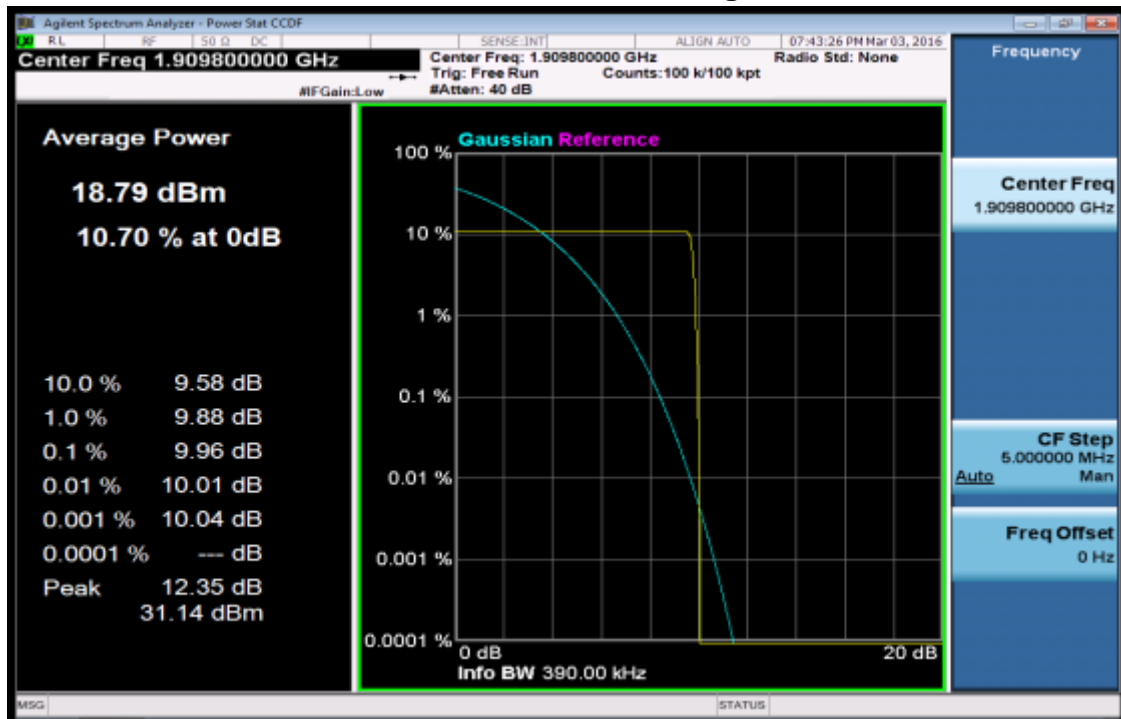
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GPRS 1900 Channel High



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