
ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO

FCC PART 22 SUBPART H, PART 24 SUBPART E and

PART 27 SUBPART L REQUIREMENT

OF

Applicant: Barco NV
President Kennedypark 35, 8500 Kortrijk, Belgium

Product Name: Pulse

Brand Name: Barco NV

Model No.: R8767900, R87679001

Model Difference: Only difference between both is the modular boards have been removed to be able to send an empty Pulse to the costumer

FCC ID: 2AOUF-R8767900X

Report Number: ER/2017/90085

FCC Rule Part: 2, 22H & 24E & 27L

Issue Date: Jan. 08, 2018

Date of Test: Oct. 03, 2017

Date of EUT Received: Sep. 13, 2017

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 ANSI C63.26-2015 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.

Prepared By:

Karen Huang

Karen Huang / Clerk

Approved By:

Jim Chang

Jim Chang / Asst. Manager



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Revision History

Report Number	Revision	Description	Issue Date
ER/2017/90085	Rev.00	Initial creation of document	Jan. 08, 2018

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1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	Pulse
Brand Name:	Barco NV
Model No.:	R8767900, R87679001
Model difference:	Only difference between both is the modular boards have been removed to be able to send an empty Pulse to the costumer
Product HW version:	10
Product SW version:	1,3,10
Power Supply:	12Vdc from DC power source

GPRS / WCDMA:

Cellular Phone Standards Frequency Range and Power	Operating Frequency	
	GPRS 850	824.2 MHz– 848.8 MHz
	EDGE 850	824.2 MHz– 848.8 MHz
	GPRS 1900	1850.2MHz – 1909.8MHz
	EDGE 1900	1850.2MHz – 1909.8MHz
	WCDMA / HSPA+ Band II	1852.4MHz – 1907.6MHz
	WCDMA / HSPA+ Band IV	1712.4MHz – 1752.6MHz
	WCDMA / HSPA+ Band V	826.4MHz - 846.6MHz
IMEI:	356136071257200	

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Type of Emission:

Frequency Band	Type of Emission:
GPRS 850	243KGXW
EDGE 850	268KG7W
GPRS 1900	245KGXW
EDGE 1900	252KG7W
WCDMA Band II	4M06F9W
HSDPA Band II	4M04F9W
HSUPA Band II	4M04F9W
WCDMA Band IV	4M06F9W
HSDPA Band IV	4M05F9W
HSUPA Band IV	4M04F9W
WCDMA Band V	4M07F9W
HSDPA Band V	4M04F9W
HSUPA Band V	4M04F9W

Max ERP/EIRP Power Measurement Result:

	dBm		W
GPRS 850	22.53	ERP	0.179
EDGE 850	23.96	ERP	0.249
GPRS 1900	23.52	EIRP	0.225
EDGE 1900	23.49	EIRP	0.223
WCDMA Band II	21.11	EIRP	0.129
HSDPA Band II	20.38	EIRP	0.109
HSUPA Band II	20.32	EIRP	0.108
WCDMA Band IV	21.59	EIRP	0.144
HSDPA Band IV	22.45	EIRP	0.176
HSUPA Band IV	22.21	EIRP	0.166
WCDMA Band V	18.89	ERP	0.077
HSDPA Band V	19.96	ERP	0.099
HSUPA Band V	20.11	ERP	0.103

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1.2. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22, 24, 27

ANSI / TIA / EIA 603-D-2010

KDB971168 D01 Power Meas license Digital System

KDB941225 of the Output power Procedure of (SAR Measurement Procedures for 3G Devices, WCDMA / HSPA) was used for EUT and Base station setting.

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

Note: All test items have been performed and record as per the above standards.

1.3. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Number and Designation number are: 509634 / TW0001

1.4. Special Accessories

No special accessories were used during testing.

1.5. 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, attenuator and splitter.

Low Band: Offset = RF cable loss (dB) + attenuation factor(dB) =4.1+10=14.1(dB)

High Band: Offset = RF cable loss (dB) + attenuation factor(dB) =4.1+10=14.1(dB)

2.5. Final Amplifier Voltage and Current Information:

Test mode	DC voltage (V)	DC current (mA)
GPRS 850	12	1137
GPRS 1900	12	1097
EDGE 850	12	1130
EDGE 1900	12	11.21
WCDMA B2	12	1213
WCDMA B4	12	1237
WCDMA B5	12	1219
HSUPA B2	12	1176
HSUPA B4	12	1173
HSUPA B5	12	1163
HSDPA B2	12	1183
HSDPA B4	12	1165
HSDPA B5	12	1172

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2.6. Configuration of Tested System

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

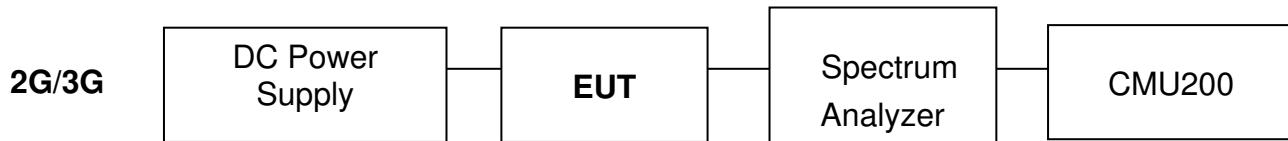
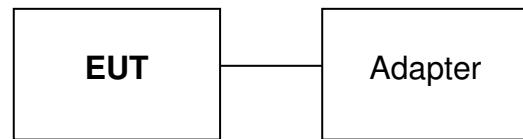


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



Remote Side

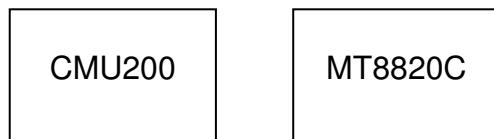


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	R&S	CMU200	102189	shielded	Un-shielded
2.	Universal Radio Communication Tester	Anritsu	MT8820C	6200307563	shielded	Un-shielded

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046	RF Power Output	Compliant
§2.1046(a) §22.913(a)(5) §24.232(c) §27.50(d)(4) §27.50(h)(2)	ERP/ EIRP measurement	Compliant
§2.1049(h)	99% & 26dB Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(m)(4)(6)	Out of Band Emissions at Antenna Terminals and Band Edge / Emission mask requirements	Compliant
§2.1053 §22.917(a) §24.238(a) §27.53(h) §27.53(m)	Field Strength of Spurious Radiation	Compliant
§24.232(d) §27.50(d)(5)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235 §27.54	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, X(E1)Y(E2)Z(H) 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 and Wireless charging Cover
GPRS/EDGE 850	E2-plan	E2-plan
GPRS/EDGE 1900	E2-plan	E2-plan
WCDMA/HSPA Band II	E2-plan	E2-plan
WCDMA/HSPA Band IV	E2-plan	E2-plan
WCDMA/HSPA Band V	E2-plan	E2-plan

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GPRS/EDGE MODE

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

WCDMA/HSPA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band V
EIRP	9262 to 9538 1312 to 1513	9262, 9400, 9583 1312, 1413, 1513	WCDMA/HSPA Band II WCDMA/HSPA Band IV
FREQUENCY STABILITY	4132 to 4233 1312 to 1513 9262 to 9538	4183 1413 9400	WCDMA Band II WCDMA Band IV WCDMA Band V
OCCUPIED BANDWIDTH	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA/HSPA Band II WCDMA/HSPA Band IV WCDMA/HSPA Band V
PEAK TO AVERAGE RATIO	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA/HSPA Band II WCDMA/HSPA Band IV WCDMA/HSPA Band V
BAND EDGE	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4233 1312, 1513 9262, 9583	WCDMA Band II WCDMA Band IV WCDMA Band V
CONDUCETED EMISSION	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA Band II WCDMA Band IV WCDMA Band V
RADIATED EMISSION	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	HSDPA Band II HSUPA Band IV WCDMA Band V

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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)	9kHz – 30MHz: +/- 2.87 dB
	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)	9kHz – 30MHz: +/- 2.87 dB
	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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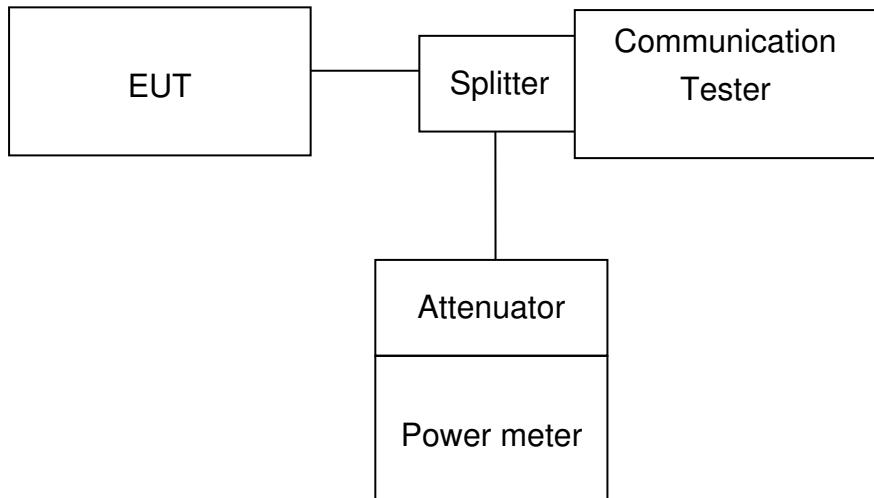
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6. RF CONDUCTED OUTPUT POWER MEASUREMENT

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.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCD-MA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results

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6.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HU-BER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	10/27/2016	10/26/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

6.5. Measurement Result

RF Conducted Output Power

EUT Mode	Frequency (MHz)	CH	Average Burst Power (1DN 1UP) Class 8 (dBm)
GPRS 850	824.2	128	29.45
	836.6	190	29.35
	848.8	251	29.05
GPRS 1900	1850.2	512	28.4
	1880.0	661	28.3
	1909.8	810	28.15
EDGE 850	824.2	128	24.73
	836.6	190	24.61
	848.8	251	24.6
EDGE 1900	1850.2	512	24.43
	1880.0	661	24.32
	1909.8	810	24.3

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WCDMA MODE:

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V8.4.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). RMC 12.2kps is used for this testing.

Results:

Mode	Avg. Power (dBm)			Avg. Power (dBm)			Avg. Power (dBm)		
	Band II Channel			Band IV Channel			Band V Channel		
	9262	9400	9538	1312	1413	1513	4132	4183	4233
WCDMA	21.36	20.37	20.38	21.96	21.14	21.20	21.80	20.96	21.02
HSDPA	21.37	20.63	20.26	21.92	21.11	21.19	21.76	20.93	20.97
HSUPA	21.72	20.92	20.45	21.89	21.02	21.13	21.55	20.71	20.75

HSDPA Release 6 MODE:

The following 4 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C10.1.4 & C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing.

HSDPA SUB-TEST Setting

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH(FOR HSDPA)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)	RMC (Kbps)
1	2/15	15/15	64	2/15	4/15	0.0	0.0	12.2
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0	12.2
3	15/15	8/15	64	15/8	30/15	1.5	0.5	12.2
4	15/15	4/15	64	15/4	30/15	1.5	0.5	12.2

Note: The recommended HSDPA MPRs are implemented as per following sub-tests.

Results:

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Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Result
		9262	9400	9538		
HSDPA II	1	21.37	20.63	20.58	20.3 ~ 25.7	Pass
	2	21.09	20.48	20.36	20.3 ~ 25.7	Pass
	3	20.63	21.62	20.39	19.8 ~ 25.7	Pass
	4	21.05	21.76	20.41	19.8 ~ 25.7	Pass

Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Result
		1312	1413	1513		
HSDPA IV	1	21.92	21.11	21.19	20.3 ~ 25.7	Pass
	2	21.81	20.91	21.03	20.3 ~ 25.7	Pass
	3	21.56	20.68	21.04	19.8 ~ 25.7	Pass
	4	21.85	20.83	20.53	19.8 ~ 25.7	Pass

Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Result
		4132	4183	4233		
HSDPA V	1	21.76	20.93	20.97	20.3 ~ 25.7	Pass
	2	21.66	20.93	20.90	20.3 ~ 25.7	Pass
	3	21.40	20.87	20.80	19.8 ~ 25.7	Pass
	4	21.50	20.92	20.67	19.8 ~ 25.7	Pass

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HSPA (HSDPA & HSUPA) Release 6 MODE

The following 5 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing

HSPA SUB-TEST Setting

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH(FOR HSUPA)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (Code s)	CM (dB)	MPR (dB)	AG Index	E-TFCI	RMC (Kbps)
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225 5	1309/225	4	1	1.0	0.0	20	75	12.2
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67	12.2
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4 4	2	2.0	1.0	15	92	12.2
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71	12.2
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81	12.2

Note: The recommended HSUPA MPRs are implemented as per following sub-tests.

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Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)		Result
		9262	9400	9538			
HSUPA II	1	21.72	20.92	20.45	18.8	~ 25.7	Pass
	2	21.50	20.63	20.01	16.8	~ 25.7	Pass
	3	21.49	20.71	20.30	17.8	~ 25.7	Pass
	4	21.60	20.81	20.31	16.8	~ 25.7	Pass
	5	21.42	20.59	20.31	18.8	~ 25.7	Pass

Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)		Result
		1312	1413	1513			
HSDPA IV	1	21.89	21.02	21.13	20.3	~ 25.7	Pass
	2	21.66	20.79	20.36	20.3	~ 25.7	Pass
	3	21.54	20.87	19.90	19.8	~ 25.7	Pass
	4	21.60	20.65	20.01	19.8	~ 25.7	Pass
	5	21.58	20.62	20.07	19.8	~ 25.7	Pass

Mode	Sub test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)		Result
		4132	4183	4233			
HSUPA V	1	21.55	20.71	20.75	18.8	~ 25.7	Pass
	2	21.53	20.69	20.20	16.8	~ 25.7	Pass
	3	21.42	20.66	20.09	17.8	~ 25.7	Pass
	4	21.35	20.61	20.36	16.8	~ 25.7	Pass
	5	21.24	20.64	20.28	16.8	~ 25.7	Pass

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Minimum Communications Power Measurement**PCS 1900 band**

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	30.7	28.7	25.9	23.7	22.4	19.6	17.4	15.6	13.3

PCL	9	10	11	12	13	14	15
Output power (dBm)	10.96	8.41	6.55	4.38	2.3	0.17	-1.82

Note: The EUT output power was controlled by simulator. Set Communication Tester [MT8820C](#) PCL as above, and get the mobile phone output power reading

WCDMA/HSDPA/HSUPA band II, IV, V

The EUT output power was controlled by simulator. Set Communication Tester MT8820C function key “UE Power Control” and enter max rated power 24dBm. The EUT is going to be set to max output power to 24dBm. Then record the read (see page 15 for measurement data). The min. power was measures by a function key “minimum power” then record the read. It is -52.3dBm. The power variation can be 0.1dB step by setting.

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7. EFFECTIVE RADIATED POWER AND EQUIVALENT ISOTROPIC RADIATED POWER MEASUREMENT

7.1. Standard Applicable

According to FCC §2.1046

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

FCC 24.232(c) Mobile and portable stations are limited to 2 W EIRP.

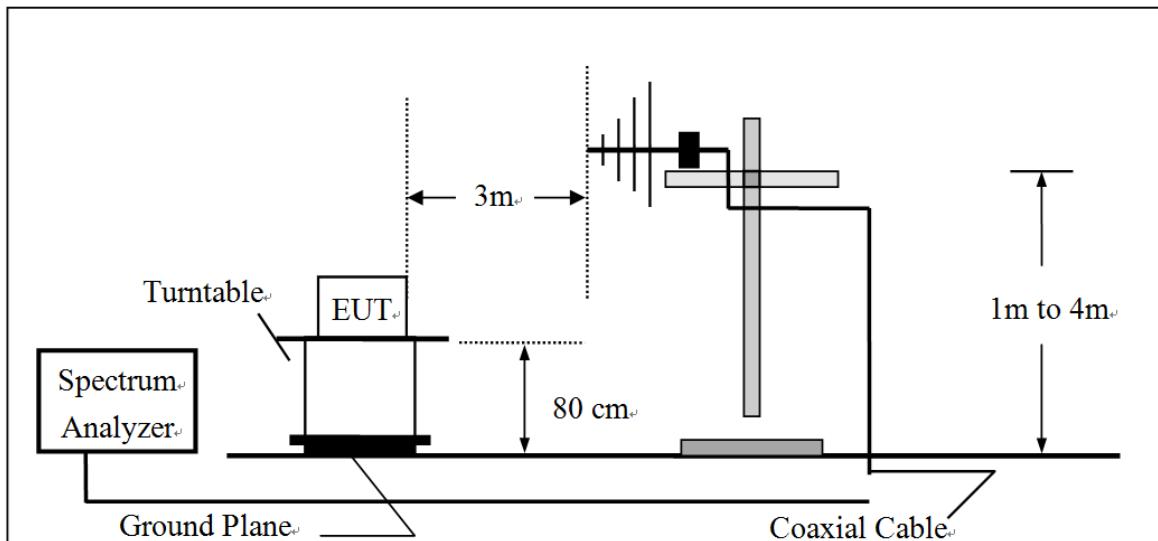
FCC 27.50(c) (10) Control stations and mobile stations are limited to 3 W ERP.

FCC 27.50(d)(4) Fixed, mobile, and portable (hand-held) stations are limited to 1W EIRP.

FCC 27, 50(h)(2) Mobile and other user stations. Mobile stations are limited to 2 W EIRP

7.2. Test SET-UP

(A) Radiated Power Test Set-Up, Frequency Below1000MHz

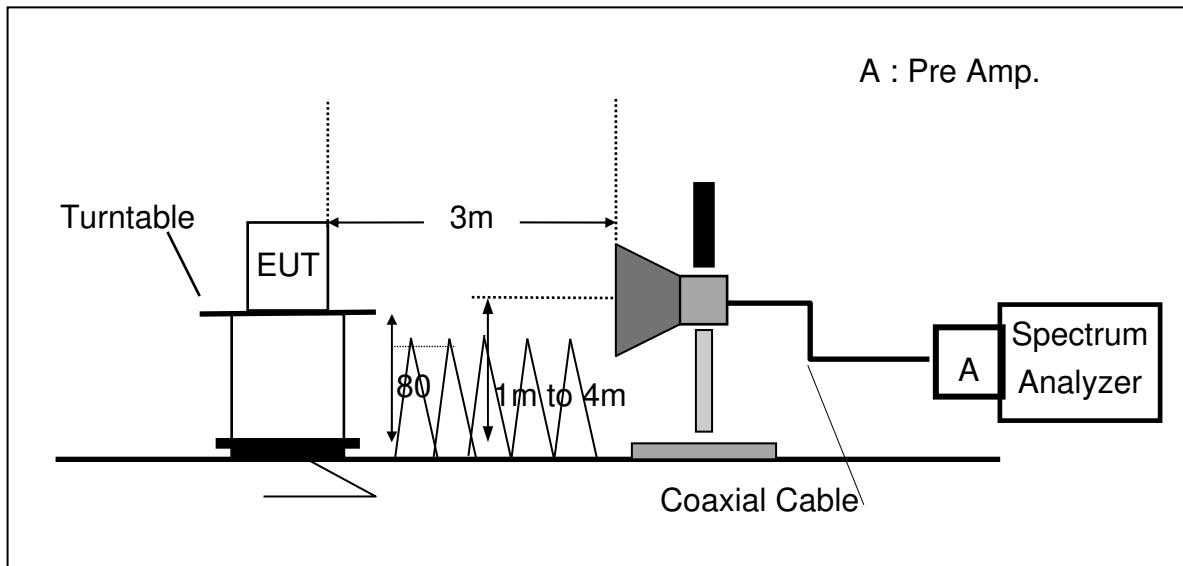


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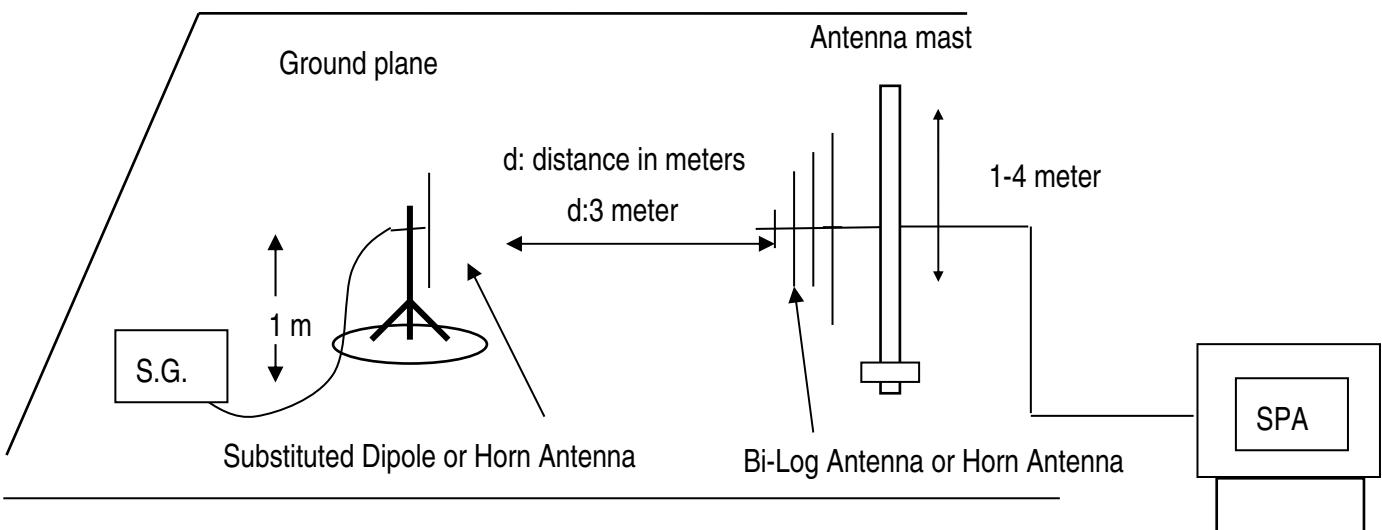
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(B) Radiated Power Test Set-UP Frequency Over 1 GHz



(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 $VBW = 3 \times RBW$;
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 = $601 \times 10^{-3} = 6s$.)

Activate trace averaging routine over a minimum of 10 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 $10 \times \log (TBW/RBW)$, 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

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2017	09/19/2018
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2017	01/02/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/13/2016	12/12/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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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	16.78	3.31	-2.92	17.16	38.45
			H	20.00	3.31	-2.92	20.38	38.45
	836.6	190	V	16.18	3.29	-2.96	16.50	38.45
			H	22.21	3.29	-2.96	22.53	38.45
EDGE 850	848.8	251	V	14.84	3.27	-3.00	15.10	38.45
			H	22.23	3.27	-3.00	22.50	38.45
	824.2	128	V	18.35	3.31	-2.92	18.73	38.45
			H	23.58	3.31	-2.92	23.96	38.45
	836.6	190	V	16.77	3.29	-2.96	17.09	38.45
			H	22.50	3.29	-2.96	22.83	38.45
	848.8	251	V	16.74	3.27	-3.00	17.01	38.45
			H	22.04	3.27	-3.00	22.31	38.45

Remark: The RBW,VBW of SPA for frequency RBW=300 KHz, VBW=1MHz

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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 1900	1850.2	512	V	12.88	9.94	-4.46	18.36	33.00
			H	18.04	9.94	-4.46	23.52	33.00
	1880.0	661	V	11.21	10.03	-4.51	16.73	33.00
			H	16.97	10.03	-4.51	22.50	33.00
	1909.8	810	V	16.15	10.13	-4.55	21.73	33.00
			H	16.28	10.13	-4.55	21.85	33.00
	1850.2	512	V	16.93	9.94	-4.46	22.41	33.00
			H	18.02	9.94	-4.46	23.49	33.00
EDGE 1900	1880.0	661	V	16.98	10.03	-4.51	22.50	33.00
			H	17.07	10.03	-4.51	22.60	33.00
	1909.8	810	V	12.48	10.13	-4.55	18.06	33.00
			H	16.44	10.13	-4.55	22.02	33.00

Remark: The RBW,VBW of SPA for frequency RBW=300 KHz, VBW=1MHz

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EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
WCDMA Band II	1852.4	9262	V	10.07	9.95	-4.46	15.55	33.00
			H	15.62	9.95	-4.46	21.11	33.00
	1880.0	9400	V	7.75	10.03	-4.51	13.28	33.00
			H	13.93	10.03	-4.51	19.45	33.00
HSDPA Band II	1907.6	9538	V	7.89	10.12	-4.55	13.46	33.00
			H	15.14	10.12	-4.55	20.71	33.00
	1852.4	9262	V	9.16	9.95	-4.46	14.65	33.00
			H	14.90	9.94	-4.46	20.38	33.00
HSUPA Band II	1880.0	9400	V	7.44	10.03	-4.51	12.96	33.00
			H	13.94	10.03	-4.51	19.46	33.00
	1907.6	9538	V	9.04	10.12	-4.55	14.62	33.00
			H	14.76	10.12	-4.55	20.33	33.00
	1852.4	9262	V	9.77	9.94	-4.46	15.25	33.00
			H	14.83	9.94	-4.46	20.31	33.00
	1880.0	9400	V	8.04	10.04	-4.51	13.57	33.00
			H	13.58	10.03	-4.51	19.11	33.00
	1907.6	9538	V	7.79	10.12	-4.55	13.36	33.00
			H	14.75	10.12	-4.55	20.32	33.00

Remark: The RBW,VBW of SPA for frequency RBW=5 MHz, VBW=8 MHz

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EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
WCDMA Band IV	1712.4	1312	V	12.78	9.49	-4.31	17.96	30.00
			H	15.77	9.48	-4.31	20.94	30.00
	1732.6	1413	V	13.00	9.55	-4.31	18.25	30.00
			H	15.95	9.55	-4.31	21.19	30.00
HSDPA Band IV	1712.4	1312	V	12.46	9.62	-4.33	17.74	30.00
			H	16.30	9.62	-4.33	21.59	30.00
	1732.6	1413	V	13.26	9.48	-4.31	18.42	30.00
			H	16.26	9.48	-4.31	21.43	30.00
HSUPA Band IV	1712.4	1312	V	12.73	9.55	-4.31	17.98	30.00
			H	16.66	9.55	-4.31	21.89	30.00
	1732.6	1513	V	12.79	9.62	-4.34	18.07	30.00
			H	17.17	9.62	-4.33	22.45	30.00
	1752.6	1513	V	14.37	9.48	-4.31	19.54	30.00
			H	16.92	9.48	-4.31	22.09	30.00
	1732.6	1413	V	15.60	9.55	-4.31	20.84	30.00
			H	16.18	9.56	-4.31	21.43	30.00
	1752.6	1513	V	15.66	9.62	-4.34	20.94	30.00
			H	16.92	9.62	-4.34	22.21	30.00

Remark: The RBW,VBW of SPA for frequency RBW=5 MHz, VBW=8 MHz

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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
WCDMA Band V	826.4	4132	V	10.87	3.30	-2.93	11.24	38.45
			H	18.51	3.30	-2.93	18.89	38.45
	836.6	4183	V	10.85	3.29	-2.96	11.17	38.45
			H	18.51	3.29	-2.96	18.84	38.45
HSDPA Band V	846.6	4233	V	8.98	3.27	-2.99	9.26	38.45
			H	18.48	3.27	-2.99	18.75	38.45
	826.4	4132	V	11.49	3.30	-2.93	11.86	38.45
			H	19.59	3.30	-2.93	19.96	38.45
HSUPA Band V	836.6	4183	V	11.13	3.29	-2.96	11.45	38.45
			H	19.46	3.29	-2.96	19.79	38.45
	846.6	4233	V	9.65	3.27	-2.99	9.93	38.45
			H	19.41	3.27	-2.99	19.69	38.45
	826.4	4132	V	11.42	3.30	-2.93	11.79	38.45
			H	19.31	3.30	-2.93	19.68	38.45
	836.6	4183	V	10.67	3.29	-2.96	10.99	38.45
			H	19.67	3.29	-2.97	19.99	38.45
	846.6	4233	V	9.82	3.27	-2.99	10.09	38.45
			H	19.84	3.27	-3.00	20.11	38.45

Remark: The RBW,VBW of SPA for frequency RBW=5 MHz, VBW=8 MHz

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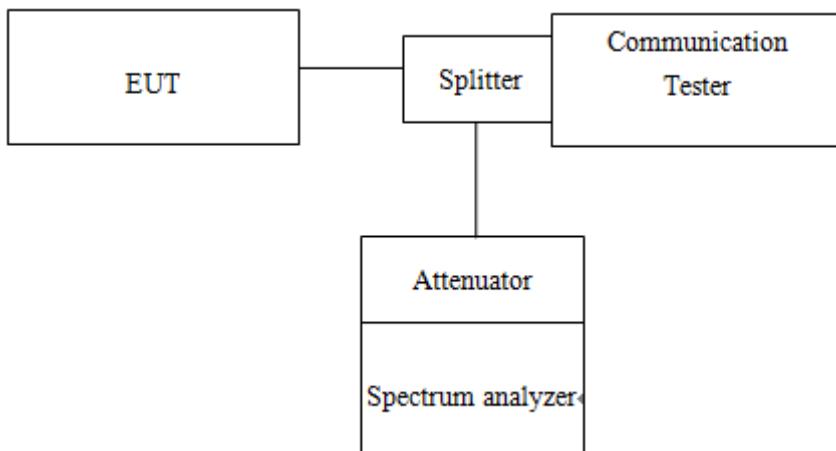
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8. OCCUPIED BANDWIDTH MEASUREMENT

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

99% & 26dB Bandwidth with detector peak

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%.

99% Bandwidth with detector sample

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW, -20dBc display line was placed on the screen (or 20dB bandwidth). Set RBW to 99% bandwidth, RBW= 1% ~ 5%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

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8.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HU-BER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	10/27/2016	10/26/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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8.5. Measurement Result

Freq. (MHz)	CH	99% BW (MHz)			26 dB BW (MHz)		
		GSM 850	GPRS 850	EDGE 850	GSM 850	GPRS 850	EDGE 850
824.2	128	-	0.24193	0.26529	-	0.31890	0.34550
836.6	190	-	0.24149	0.26205	-	0.31630	0.34890
848.8	251	-	0.24340	0.26805	-	0.32020	0.35900

Freq. (MHz)	CH	99% BW (MHz)			26 dB BW (MHz)		
		GSM 1900	GPRS 1900	EDGE 1900	GSM 1900	GPRS 1900	EDGE 1900
1850.2	512	-	0.24398	0.24691	-	0.32150	0.31700
1880.0	661	-	0.24430	0.25202	-	0.32090	0.31730
1909.8	810	-	0.24506	0.25192	-	0.32250	0.32180

Freq. (MHz)	CH	99% BW (MHz)			26 dB BW (MHz)		
		WCDMA II	HSDPA II	HSUPA II	WCDMA II	HSDPA II	HSUPA II
1850.20	9262	4.0619	4.0324	4.0370	4.6530	4.5760	4.5740
1880.00	9400	4.0605	4.0370	4.0423	4.6230	4.5600	4.5690
1909.80	9538	4.0640	4.0414	4.0359	4.6510	4.5720	4.5680

Freq. (MHz)	CH	99% BW (MHz)			26 dB BW (MHz)		
		WCDMA IV	HSDPA IV	HSUPA IV	WCDMA IV	HSDPA IV	HSUPA IV
1712.40	1312	4.0592	4.0399	4.0358	4.6430	4.5760	4.5610
1732.60	1413	4.0597	4.0357	4.0372	4.6200	4.5780	4.5660
1752.60	1513	4.0628	4.0458	4.0411	4.6240	4.5970	4.5760

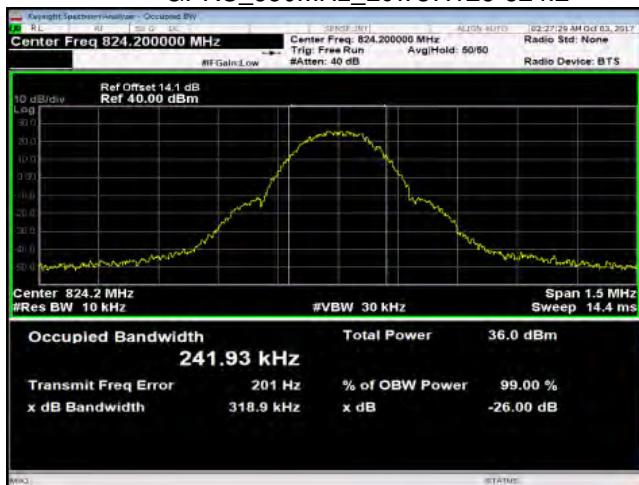
Freq. (MHz)	CH	99% BW (MHz)			26 dB BW (MHz)		
		WCDMA V	HSDPA V	HSUPA V	WCDMA V	HSDPA V	HSUPA V
826.40	4132	4.0607	4.0407	4.0432	4.6400	4.5640	4.5470
836.60	4183	4.0650	4.0375	4.0382	4.6330	4.5800	4.5610
846.60	4233	4.0609	4.0400	4.0406	4.6170	4.5580	4.5630

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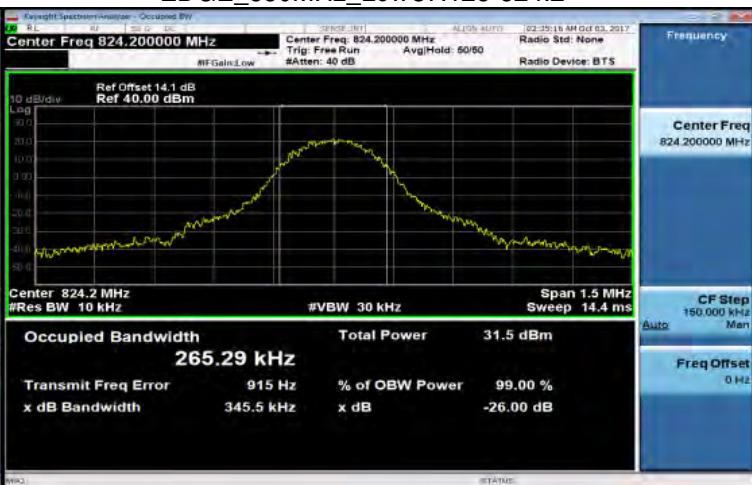
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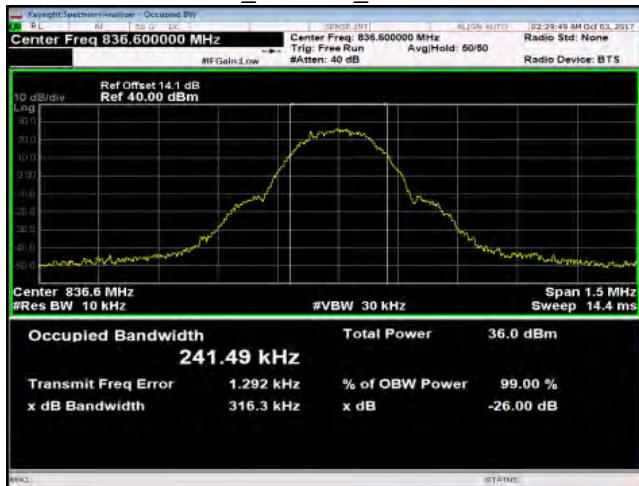
GPRS_850MHz_LowCH128-824.2



EDGE_850MHz_LowCH128-824.2



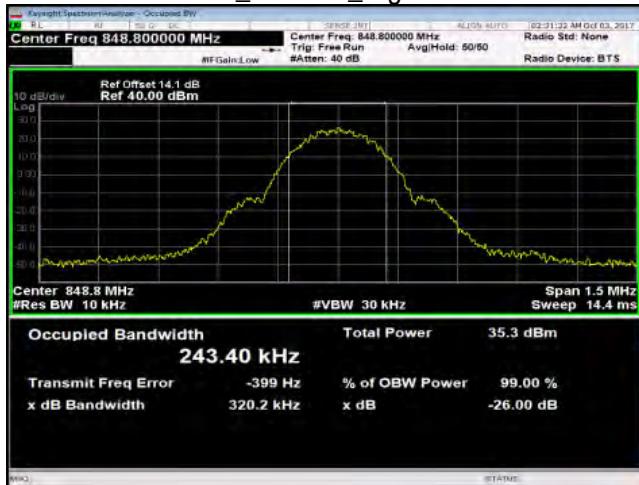
GPRS_850MHz_MidCH190-836.6



EDGE_850MHz_MidCH190-836.6



GPRS_850MHz_HighCH251-848.8



EDGE_850MHz_HighCH251-848.8

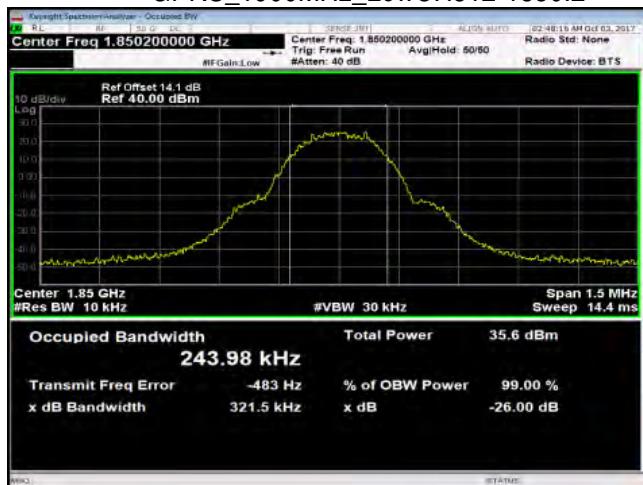


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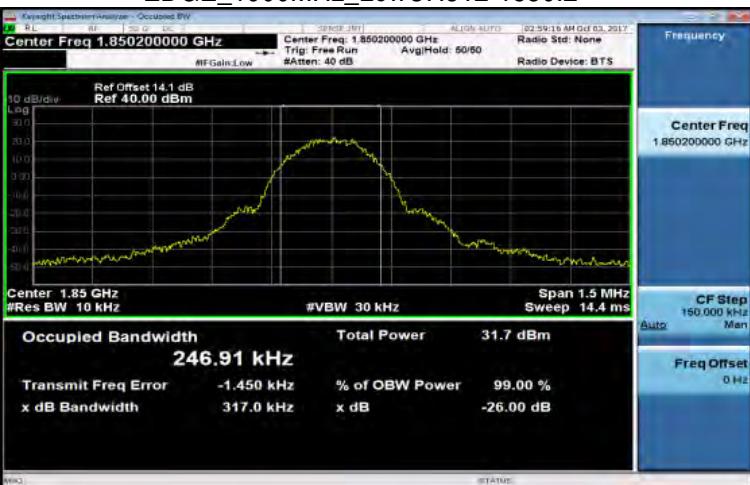
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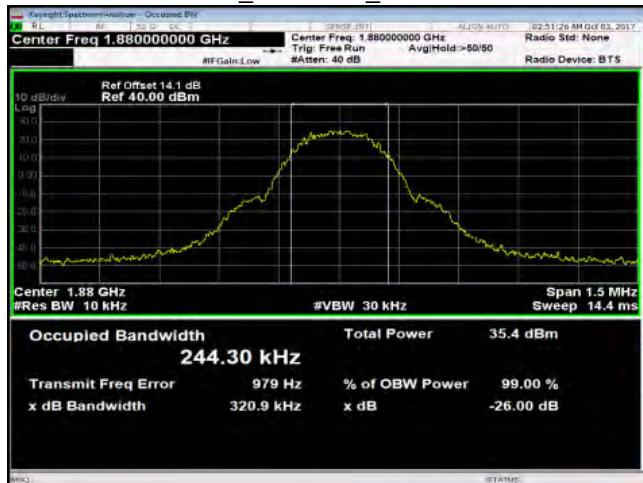
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EDGE_1900MHz_LowCH512-1850.2



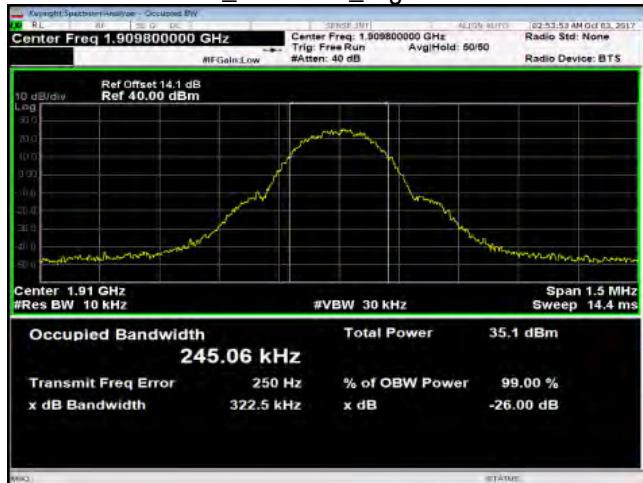
GPRS_1900MHz_MidCH661-1880



EDGE_1900MHz_MidCH661-1880



GPRS_1900MHz_HighCH810-1909.8



EDGE_1900MHz_HighCH810-1909.8

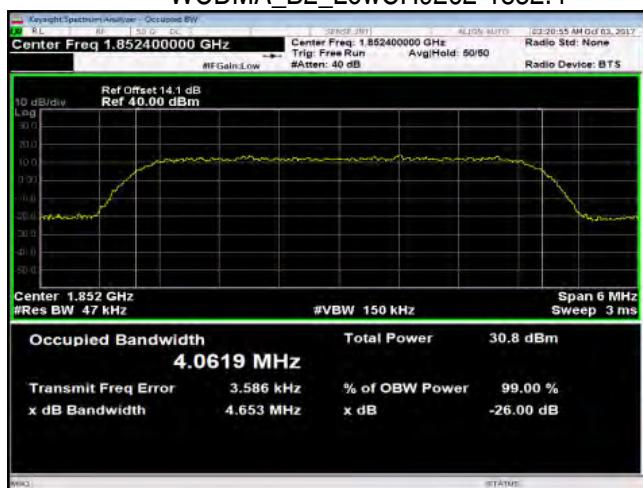


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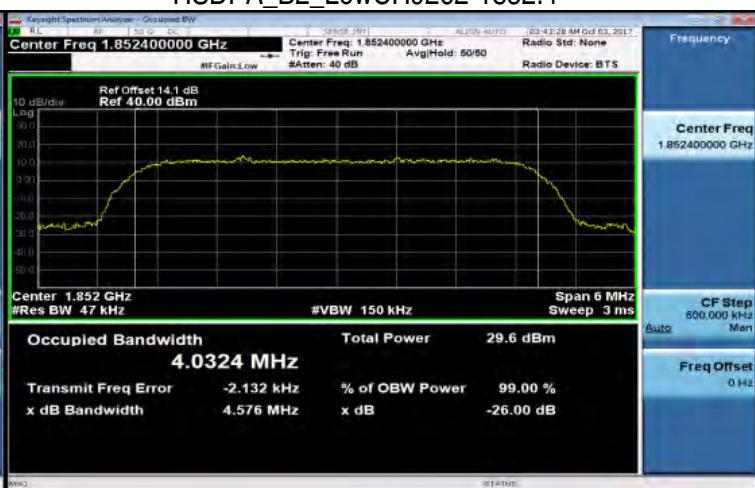
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WCDMA_B2_LowCH9262-1852.4



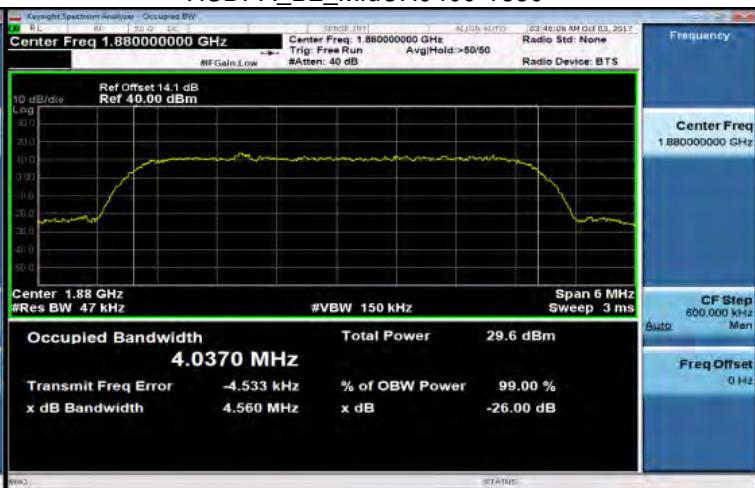
HSDPA_B2_LowCH9262-1852.4



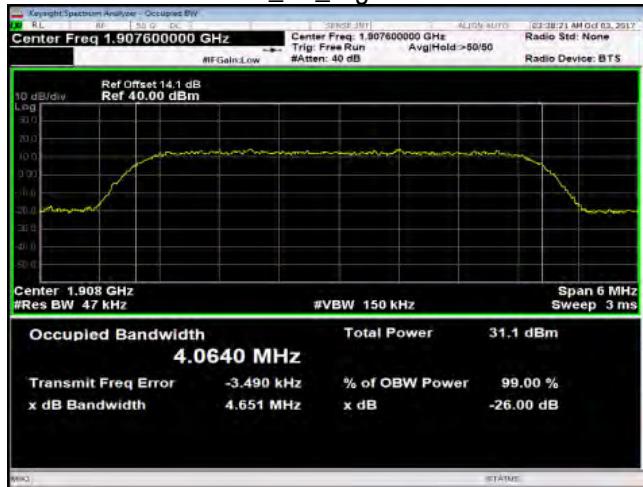
WCDMA_B2_MidCH9400-1880



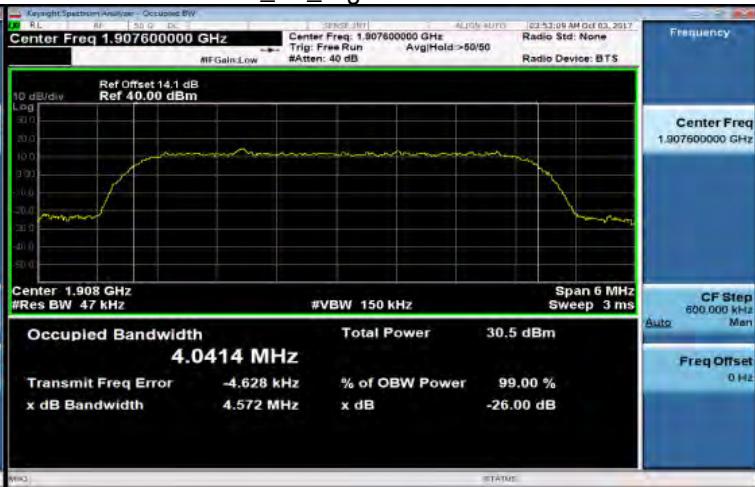
HSDPA_B2_MidCH9400-1880



WCDMA_B2_HighCH9538-1907.6



HSDPA_B2_HighCH9538-1907.6

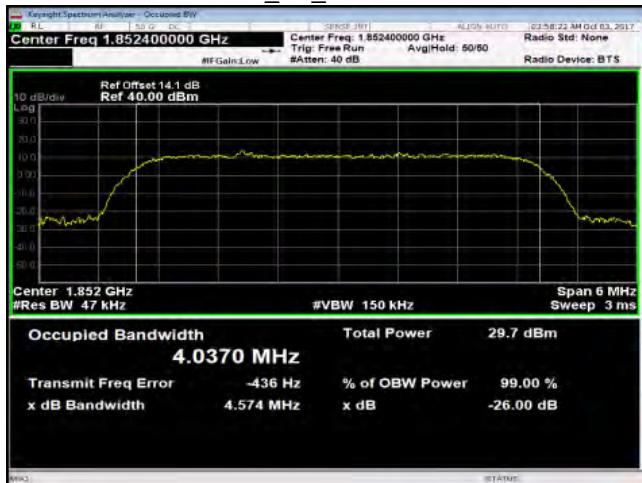


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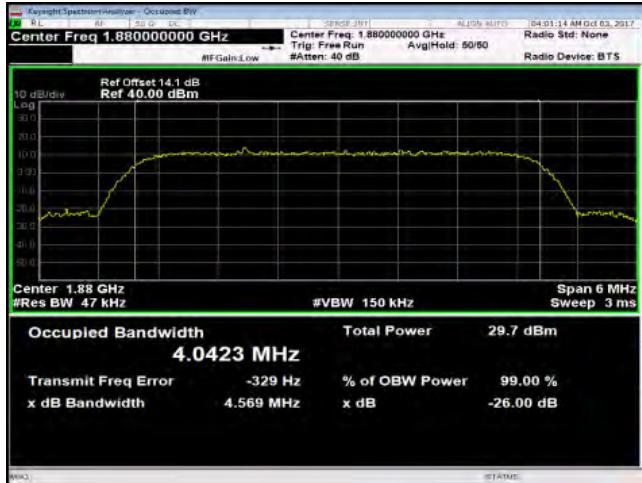
HSUPA_B2_LowCH9262-1852.4



WCDMA_B4_LowCH1312-1712.4



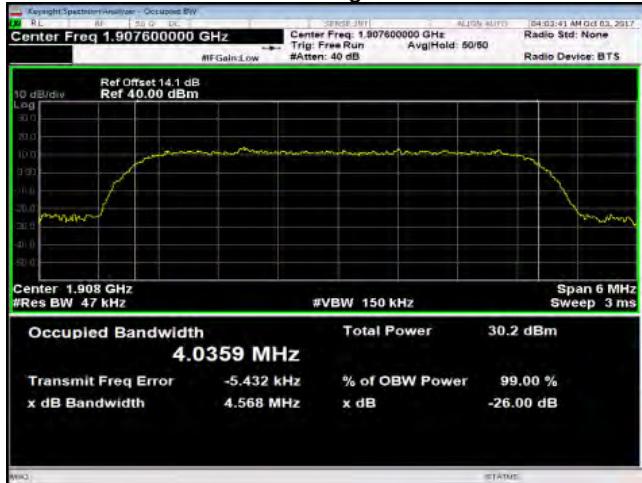
HSUPA_B2_MidCH9400-1880



WCDMA_B4_MidCH1413-1732.6



HSUPA_B2_HighCH9538-1907.6



WCDMA_B4_HighCH1513-1752.6

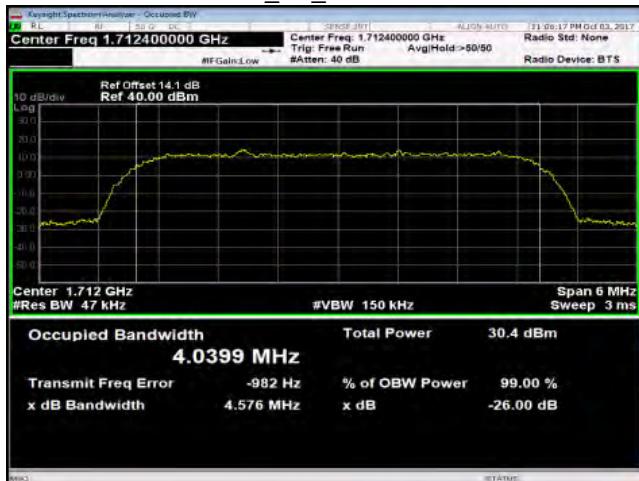


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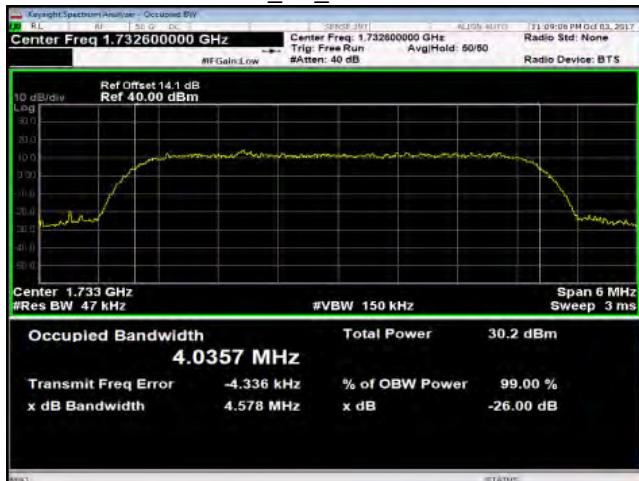
HSDPA_B4_LowCH1312-1712.4



HSUPA_B4_LowCH1312-1712.4



HSDPA_B4_MidCH1413-1732.6



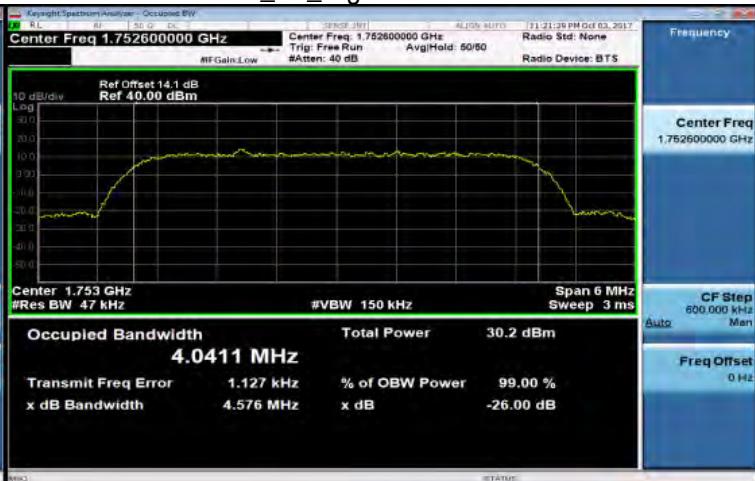
HSUPA_B4_MidCH1413-1732.6



HSDPA_B4_HighCH1513-1752.6



HSUPA_B4_HighCH1513-1752.6

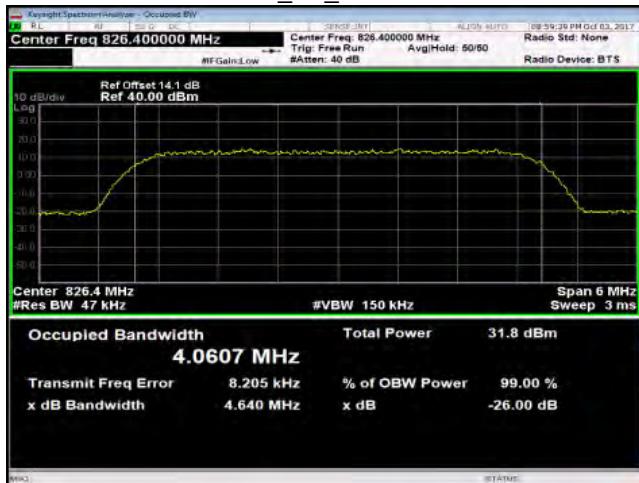


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WCDMA_B5_LowCH4132-826.4



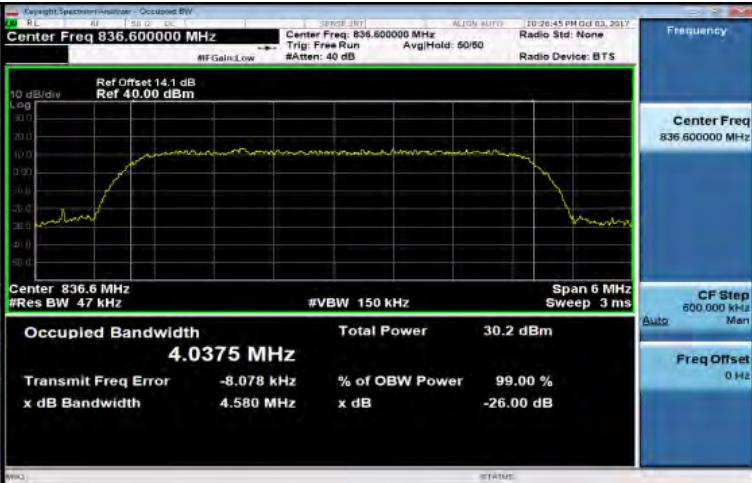
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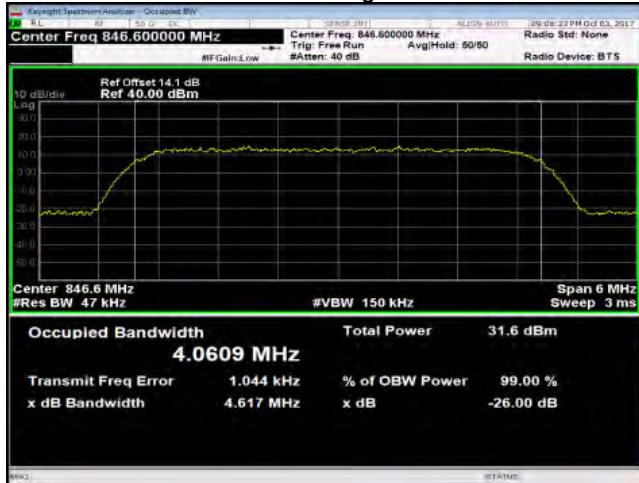
WCDMA_B5_MidCH4183-836.6



HSDPA_B5_MidCH4183-836.6



WCDMA_B5_HighCH4233-846.6



HSDPA_B5_HighCH4233-846.6



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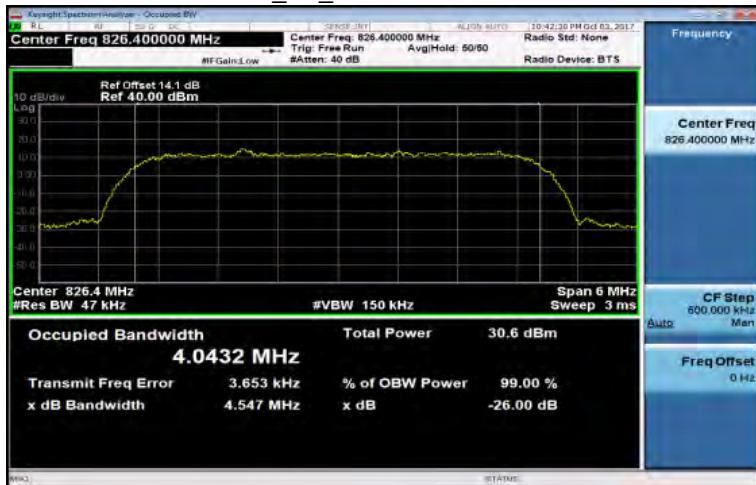
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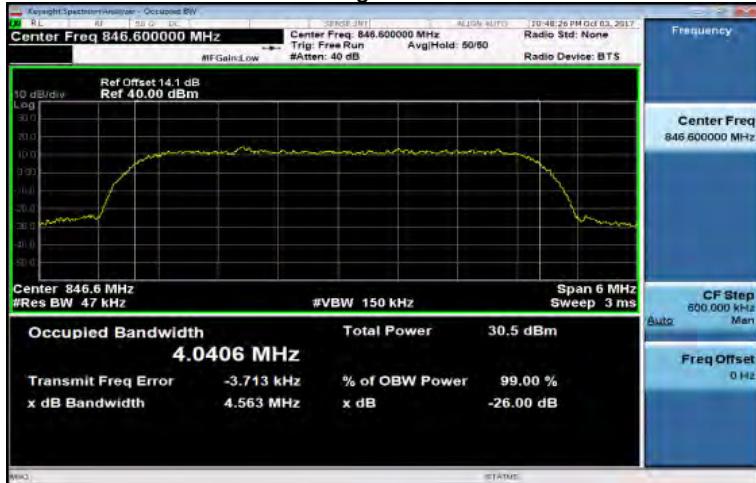
HSUPA_B5_LowCH4132-826.4



HSUPA_B5_MidCH4183-836.6



HSUPA_B5_HighCH4233-846.6



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9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1. Standard Applicable

FCC §22.917(a), §24.238(a), §27.53(g)(h), 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).

§27.53 (m) (4) shall not be less than $55 + 10 \log$ (mean output power in watt) dBc below the mean power output outside a license's frequency block (-25dBm).

FCC §27.53(g)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

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.

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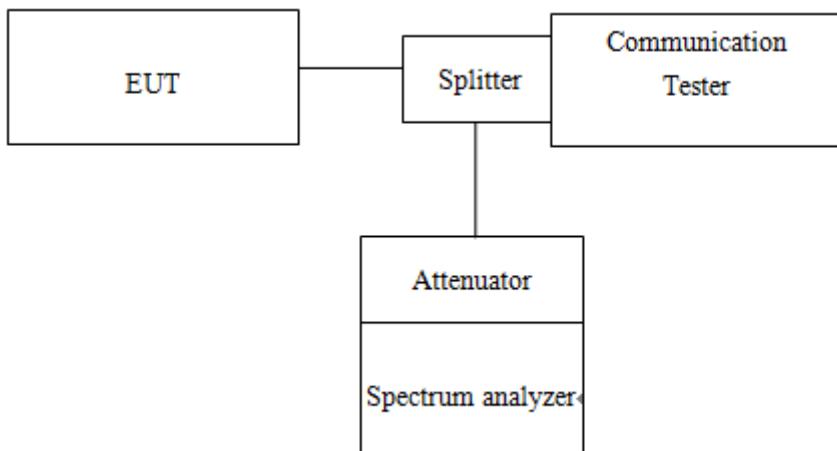
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FCC §27.53(m) (4) (6)

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in § 27.53(m)(6). In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

9.2. Test SET-UP



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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.
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.

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9.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	10/27/2016	10/26/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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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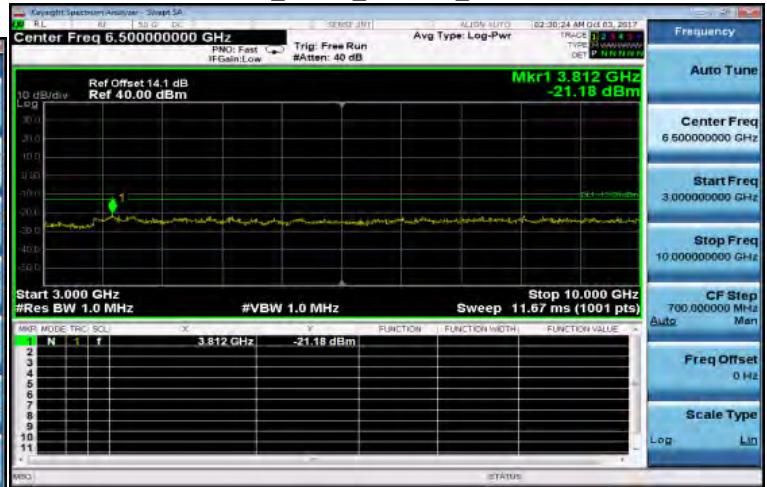
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Emission

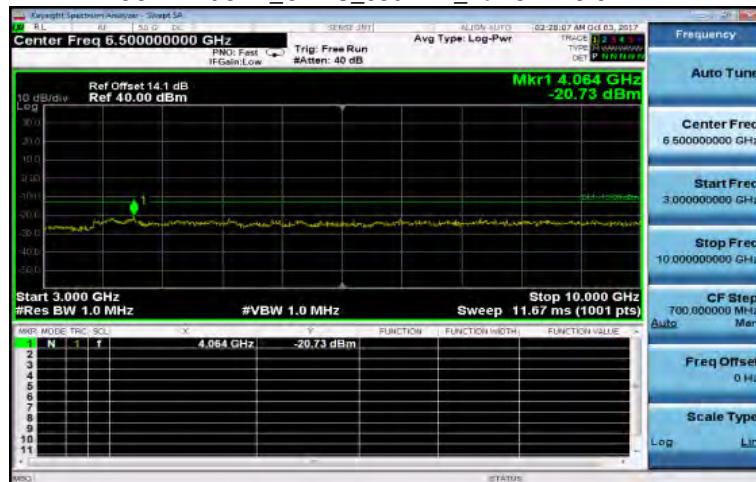
30MHz~3GHz_GPRS_850MHz_LowCH128-824.2



3GHz~10GHz_GPRS_850MHz_MidCH190-836.6



3GHz~10GHz_GPRS_850MHz_LowCH128-824.2



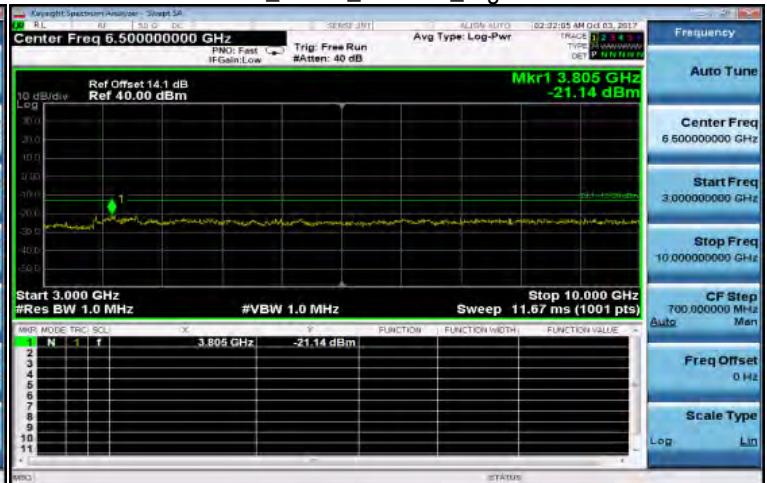
30MHz~3GHz_GPRS_850MHz_HighCH251-848.8



30MHz~3GHz_GPRS_850MHz_MidCH190-836.6



3GHz~10GHz_GPRS_850MHz_HighCH251-848.8



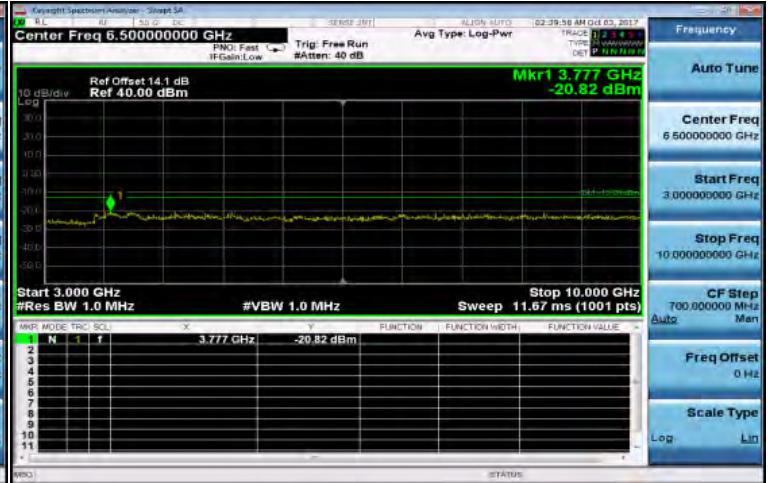
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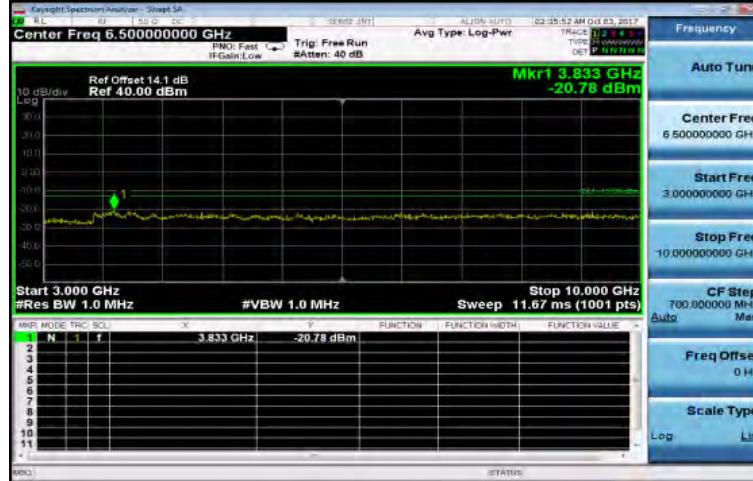
30MHz~3GHz_EDGE_850MHz_LowCH128-824.2



3GHz~10GHz_EDGE_850MHz_MidCH190-836.6



3GHz~10GHz_EDGE_850MHz_LowCH128-824.2



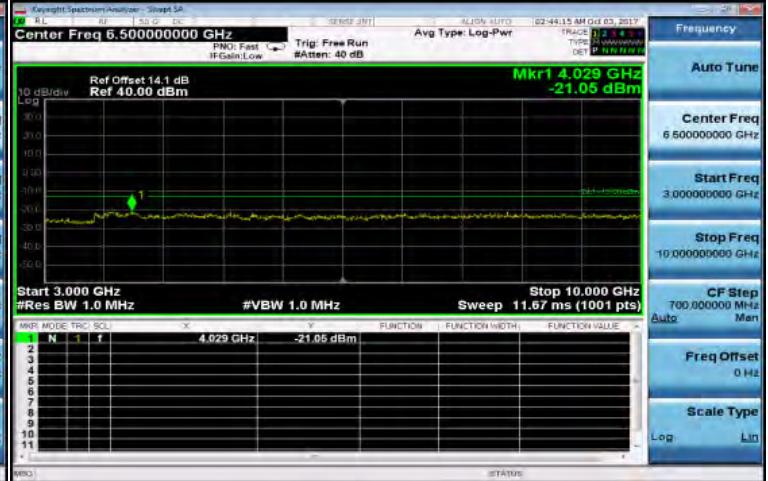
30MHz~3GHz_EDGE_850MHz_HighCH251-848.8



30MHz~3GHz_EDGE_850MHz_MidCH190-836.6



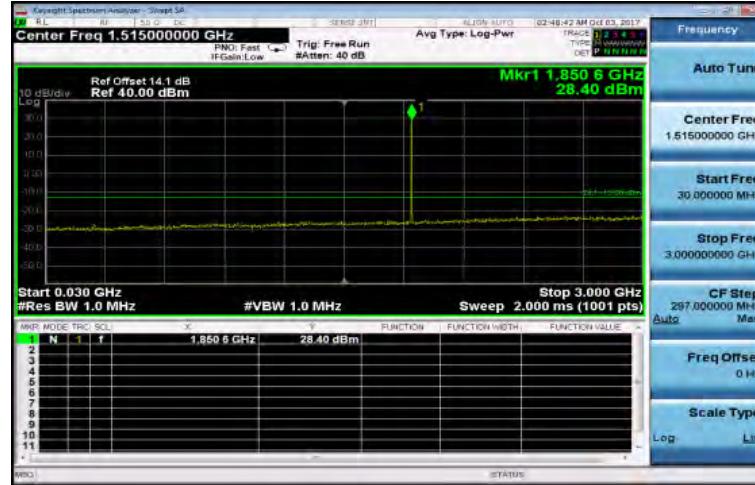
3GHz~10GHz_EDGE_850MHz_HighCH251-848.8



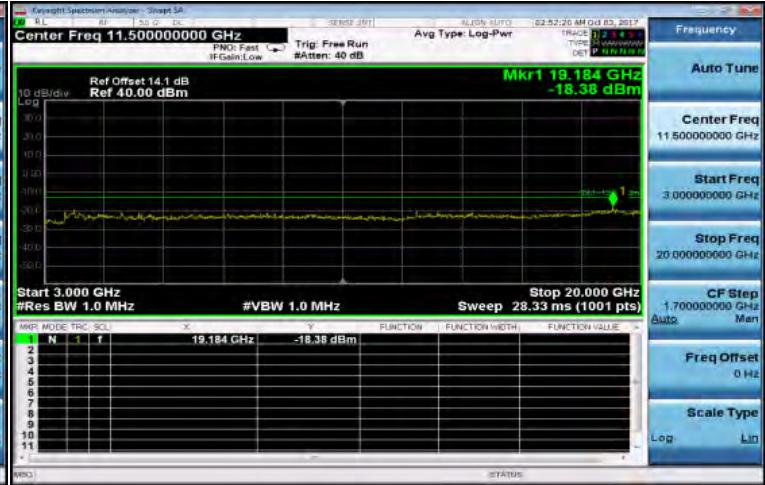
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30MHz~3GHz_GPRS_1900MHz_LowCH512-1850.2



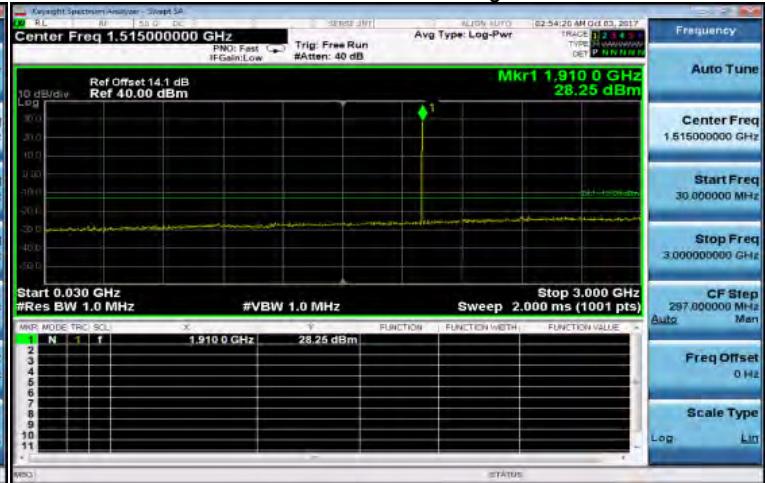
3GHz~10GHz_GPRS_1900MHz_MidCH661-1880



3GHz~10GHz_GPRS_1900MHz_LowCH512-1850.2



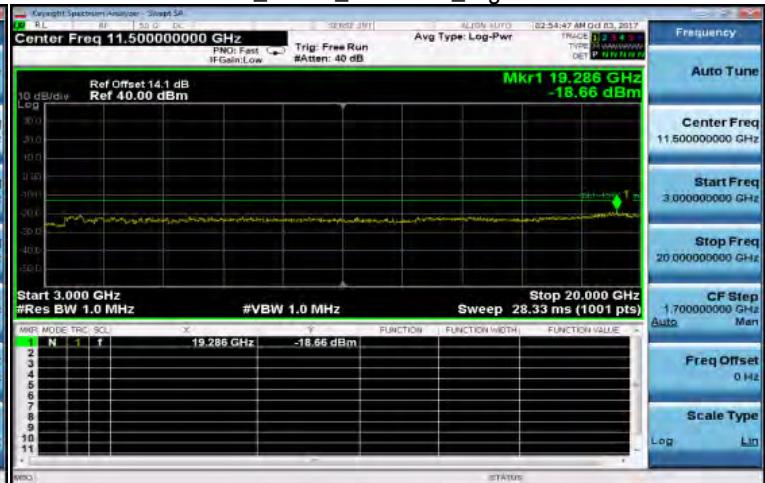
30MHz~3GHz_GPRS_1900MHz_HighCH810-1909.8



30MHz~3GHz_GPRS_1900MHz_MidCH661-1880



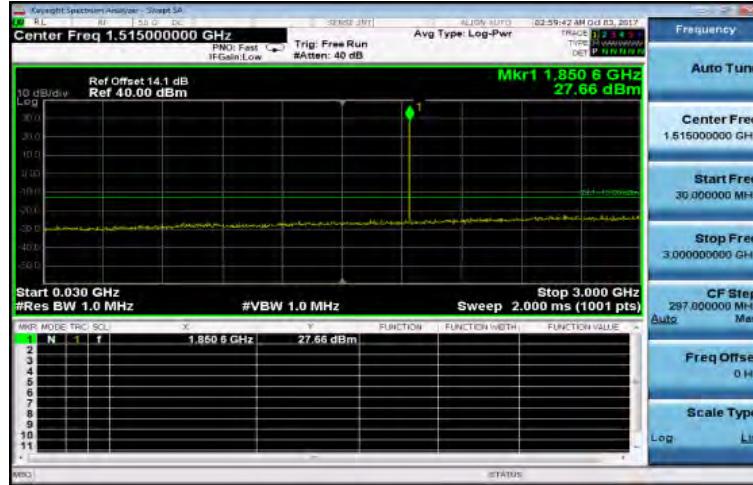
3GHz~10GHz_GPRS_1900MHz_HighCH810-1909.8



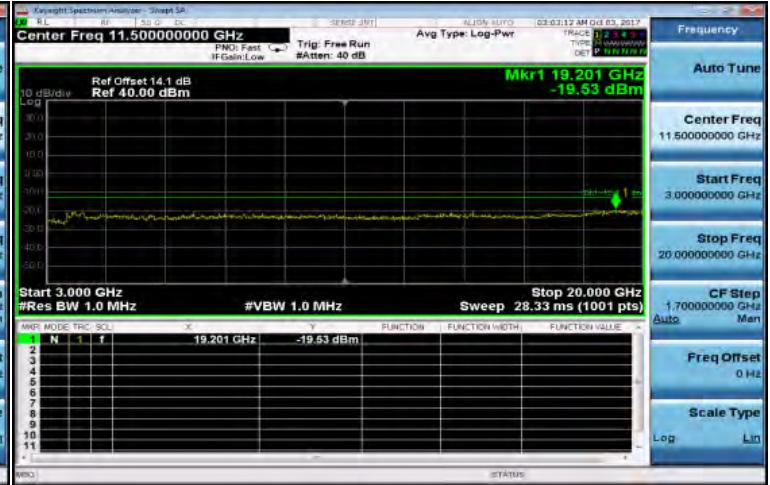
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30MHz~3GHz_EDGE_1900MHz_LowCH512-1850.2



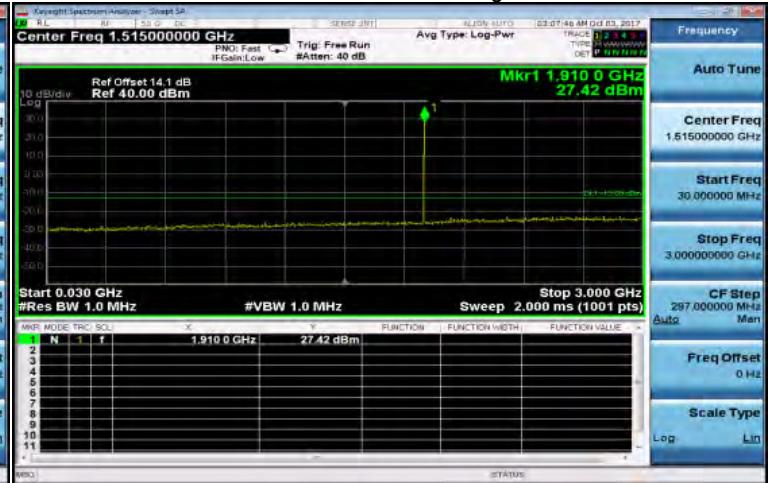
3GHz~10GHz_EDGE_1900MHz_MidCH661-1880



3GHz~10GHz_EDGE_1900MHz_LowCH512-1850.2



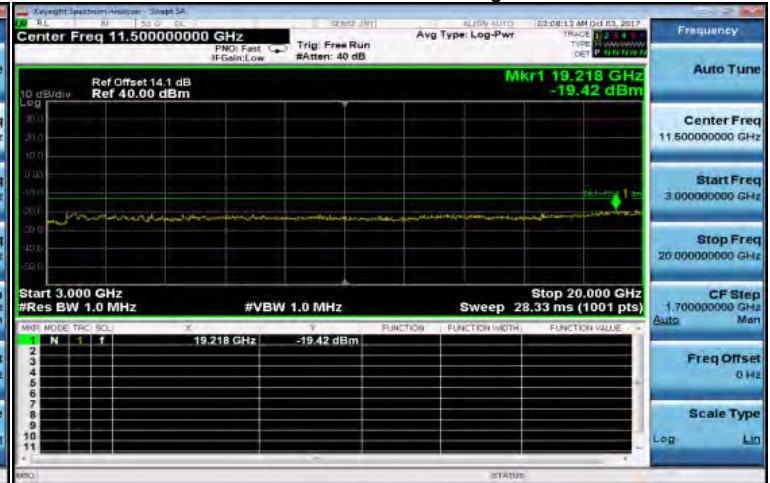
30MHz~3GHz_EDGE_1900MHz_HighCH810-1909.8



30MHz~3GHz_EDGE_1900MHz_MidCH661-1880



3GHz~10GHz_EDGE_1900MHz_HighCH810-1909.8



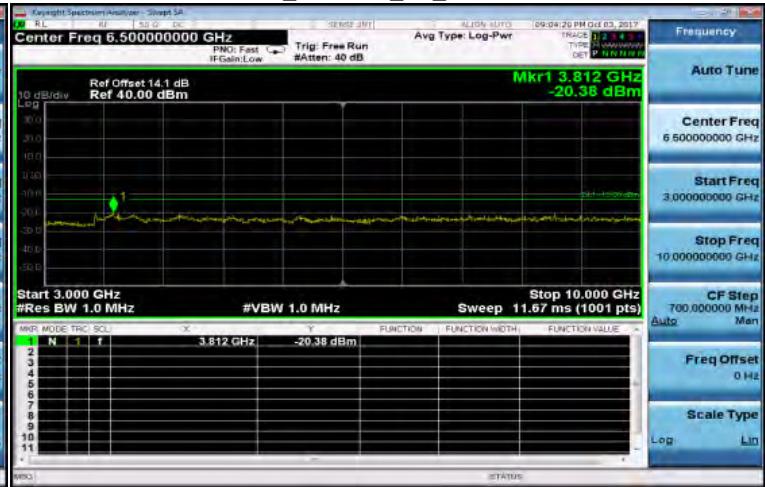
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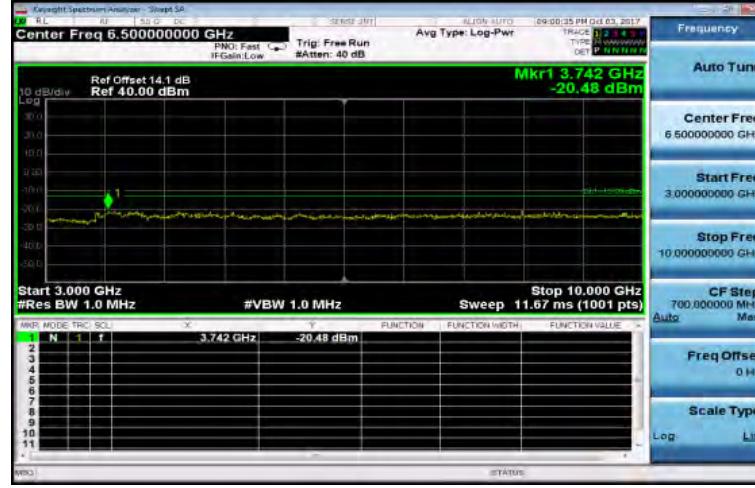
30MHz~3GHz_WCDMA_B5_LowCH4132-826.4



3GHz~10GHz_WCDMA_B5_MidCH4183-836.6



3GHz~10GHz_WCDMA_B5_LowCH4132-826.4



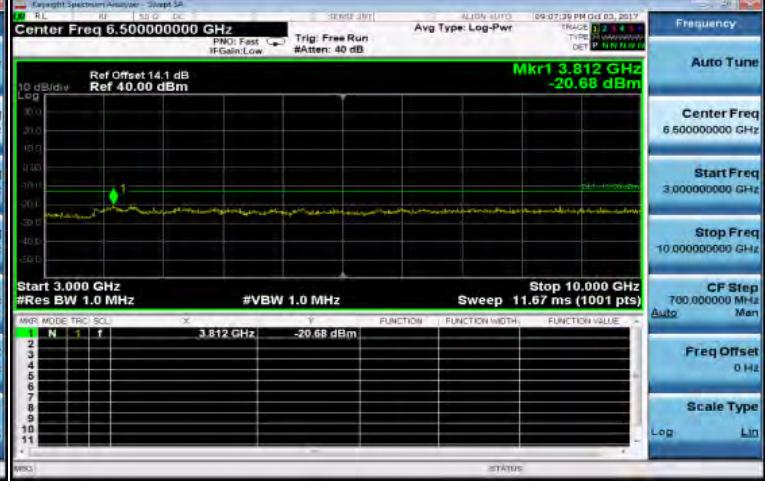
30MHz~3GHz_WCDMA_B5_HighCH4233-846.6



30MHz~3GHz_WCDMA_B5_MidCH4183-836.6



3GHz~10GHz_WCDMA_B5_HighCH4233-846.6



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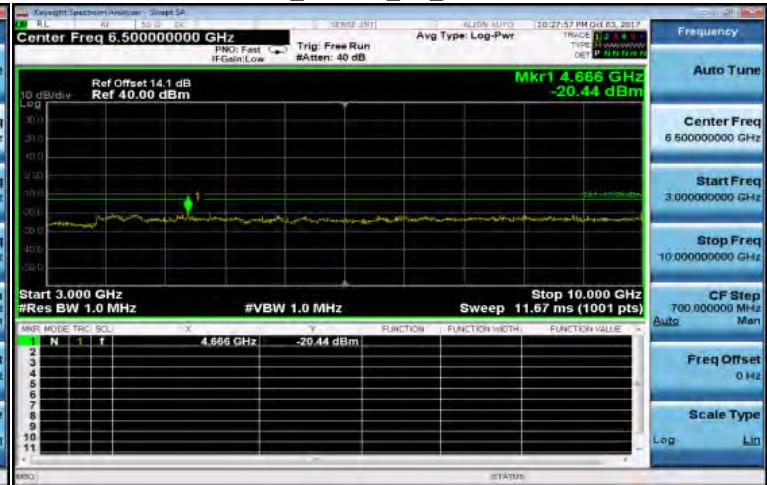
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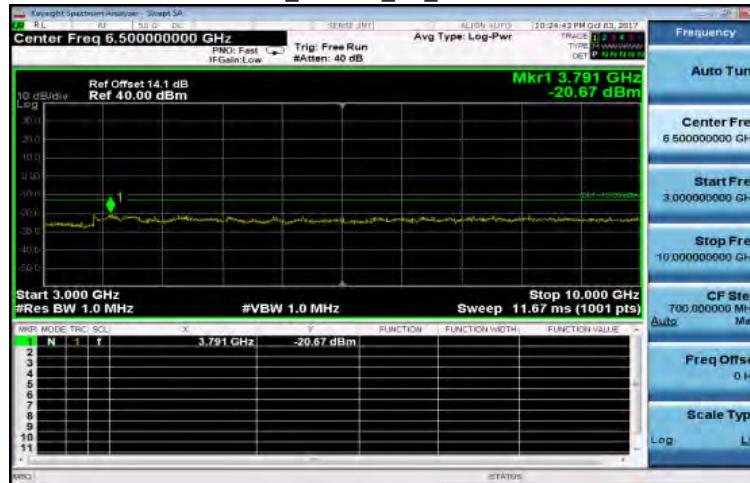
30MHz~3GHz_HSDPA_B5_LowCH4132-826.4



3GHz~10GHz_HSDPA_B5_MidCH4183-836.6



3GHz~10GHz_HSDPA_B5_LowCH4132-826.4



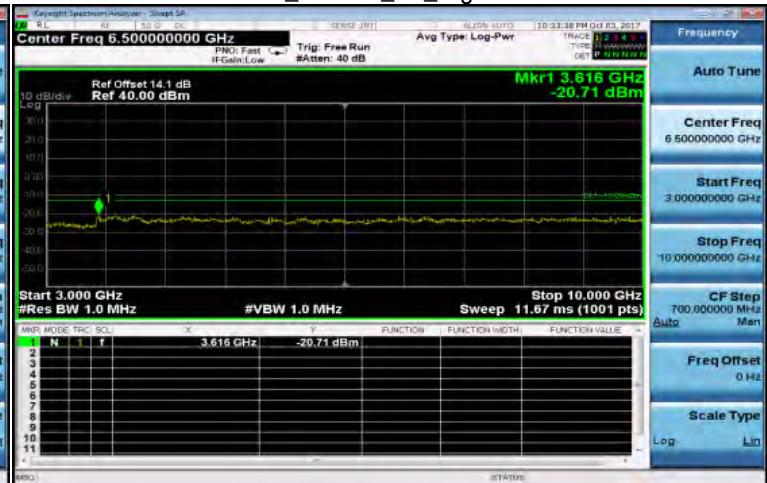
30MHz~3GHz_HSDPA_B5_HighCH4233-846.6



30MHz~3GHz_HSDPA_B5_MidCH4183-836.6



3GHz~10GHz_HSDPA_B5_HighCH4233-846.6



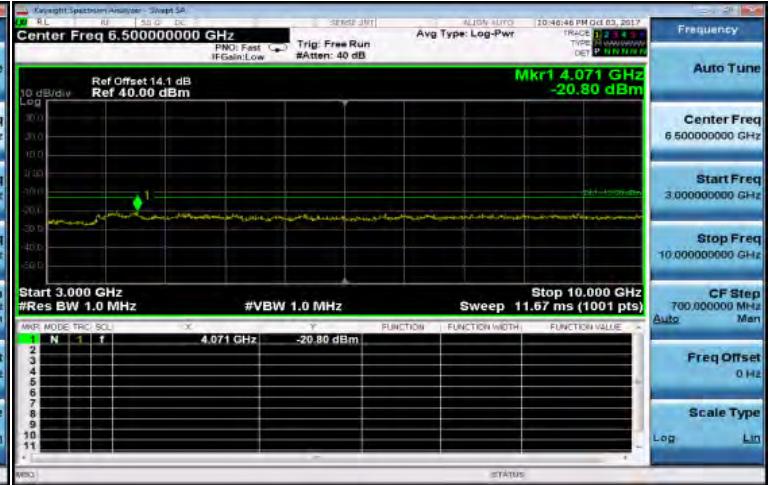
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30MHz~3GHz_HSUPA_B5_LowCH4132-826.4



3GHz~10GHz_HSUPA_B5_MidCH4183-836.6



3GHz~10GHz_HSUPA_B5_LowCH4132-826.4



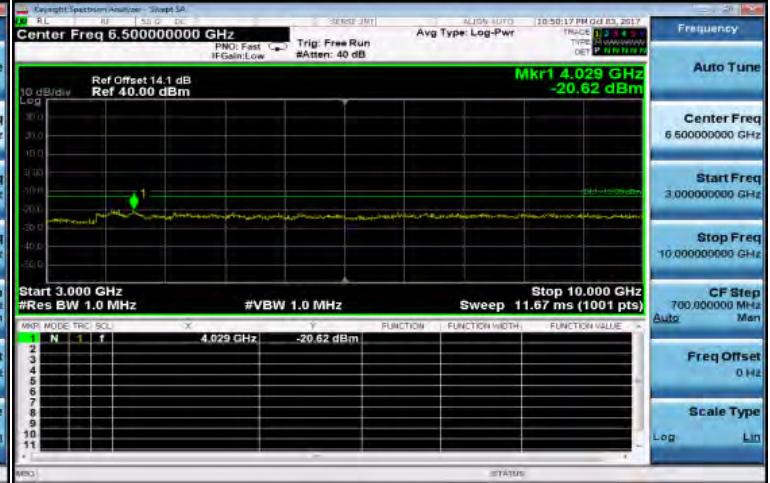
30MHz~3GHz_HSUPA_B5_HighCH4233-846.6



30MHz~3GHz_HSUPA_B5_MidCH4183-836.6



3GHz~10GHz_HSUPA_B5_HighCH4233-846.6

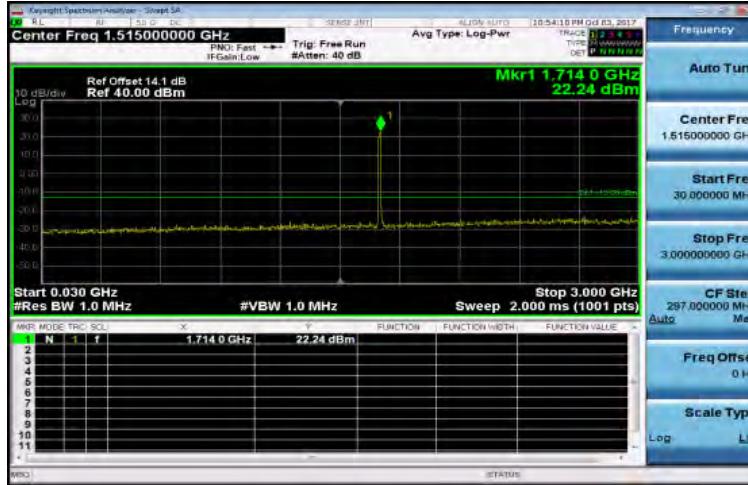


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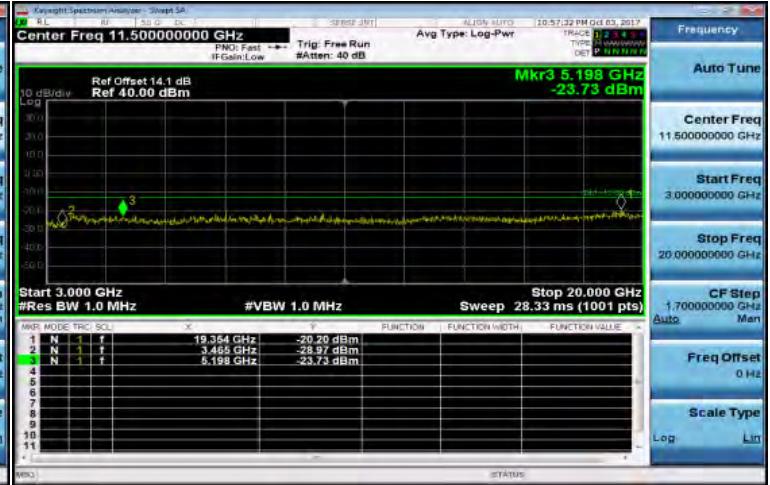
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30MHz~3GHz_WCDMA_B4_LowCH1312-1712.4



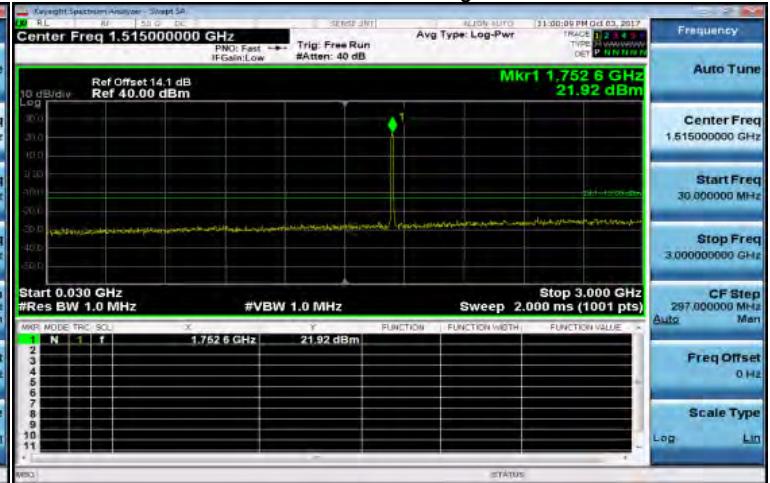
3GHz~10GHz_WCDMA_B4_MidCH1413-1732.6



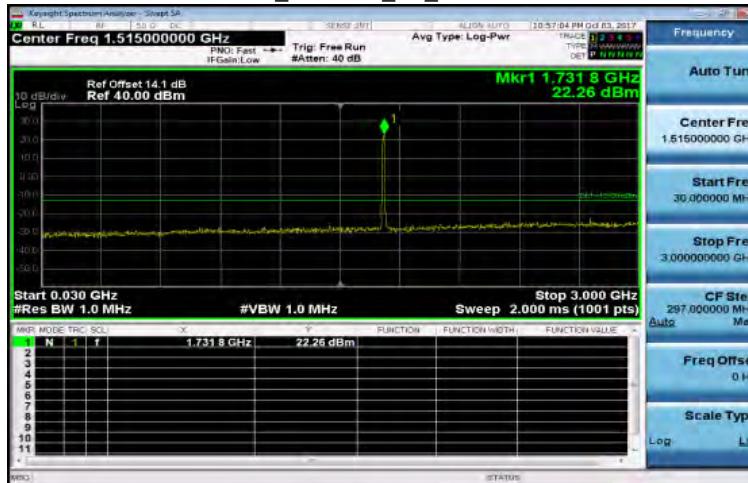
3GHz~10GHz_WCDMA_B4_LowCH1312-1712.4



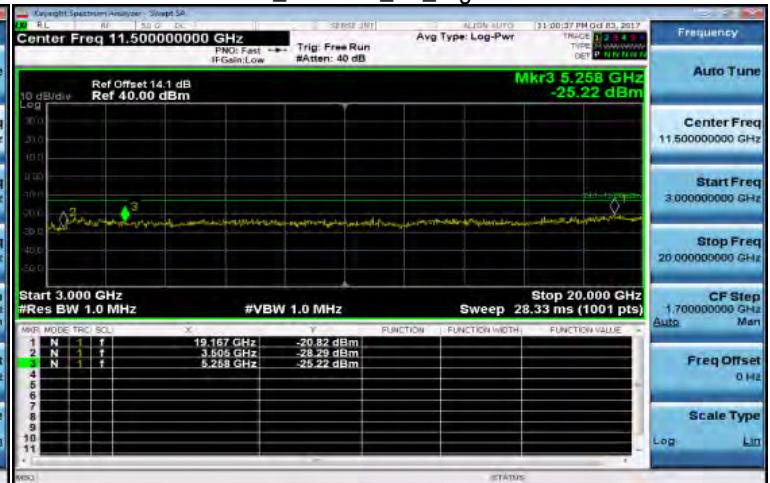
30MHz~3GHz_WCDMA_B4_HighCH1513-1752.6



30MHz~3GHz_WCDMA_B4_MidCH1413-1732.6



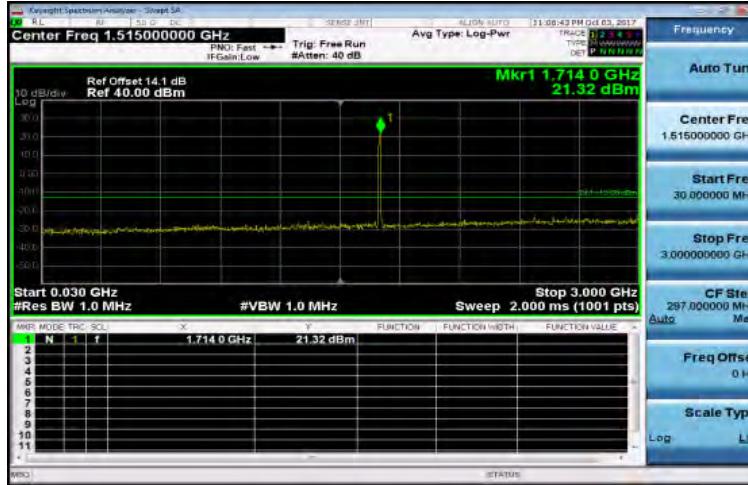
3GHz~10GHz_WCDMA_B4_HighCH1513-1752.6



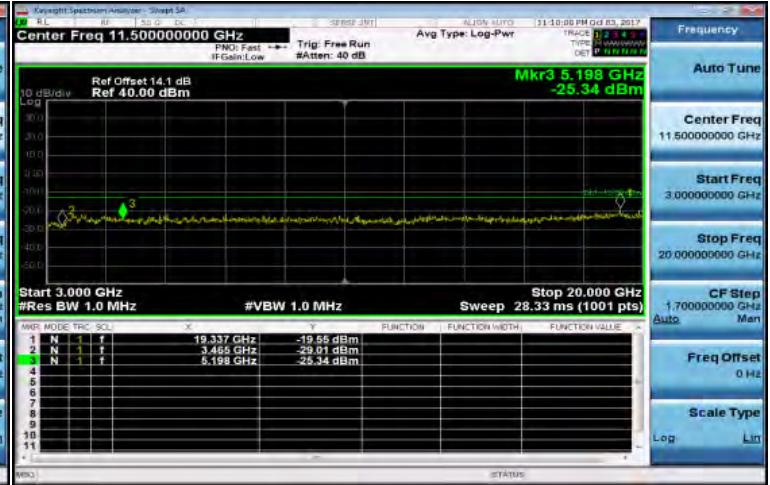
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30MHz~3GHz_HSDPA_B4_LowCH1312-1712.4



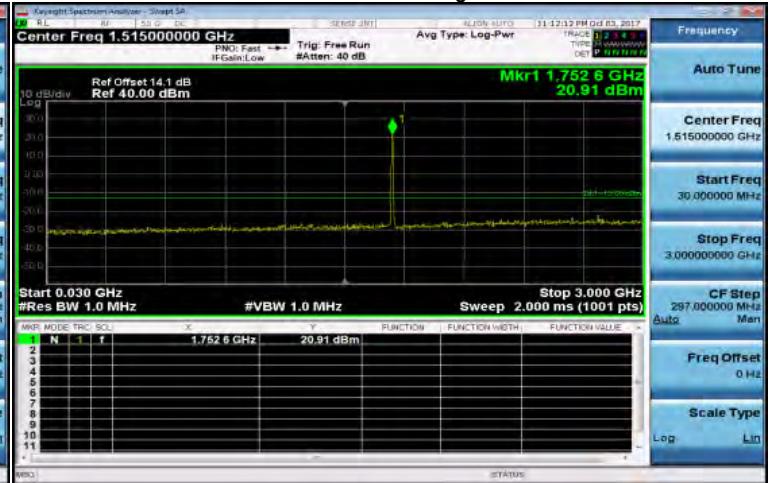
3GHz~10GHz_HSDPA_B4_MidCH1413-1732.6



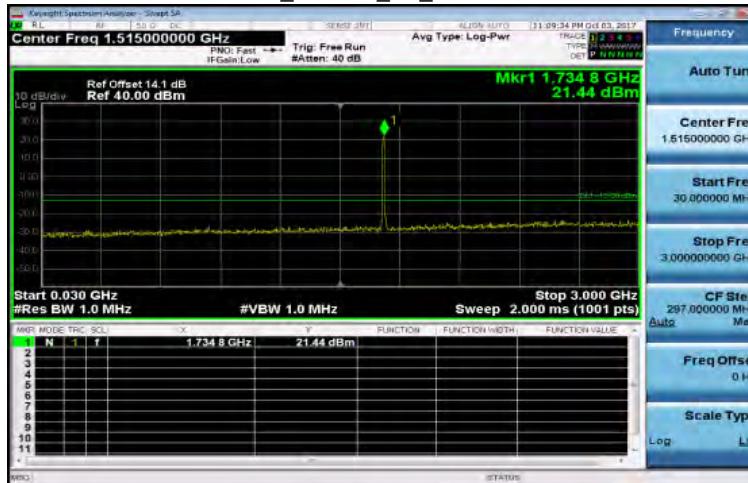
3GHz~10GHz_HSDPA_B4_LowCH1312-1712.4



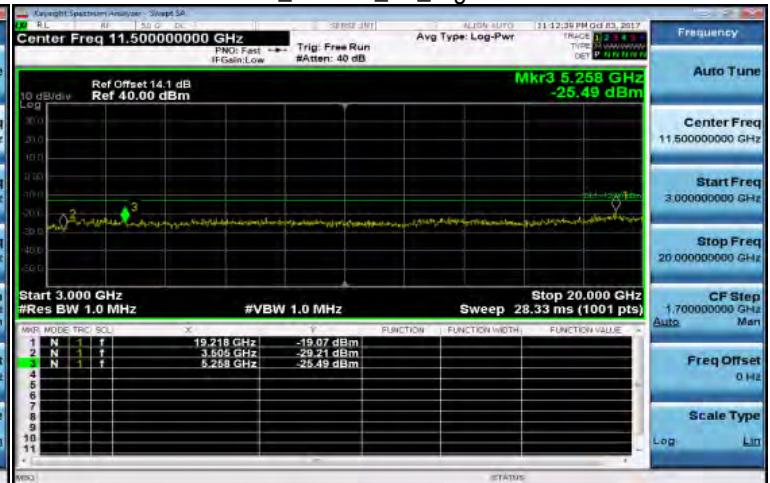
3MHz~3GHz_HSDPA_B4_HighCH1513-1752.6



30MHz~3GHz_HSDPA_B4_MidCH1413-1732.6



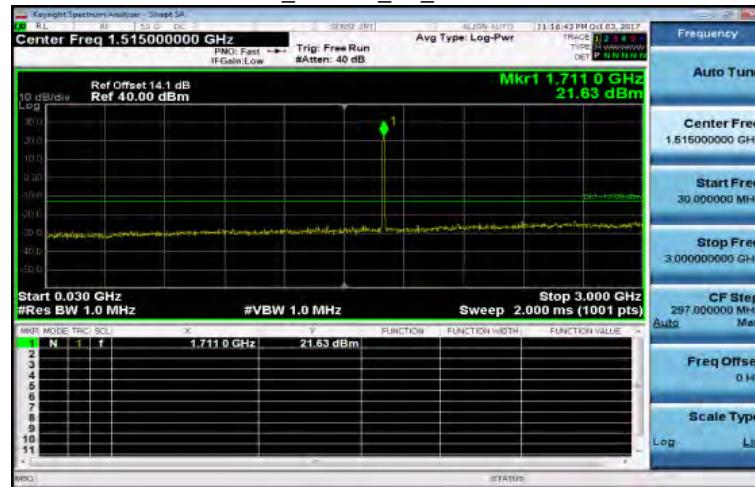
3GHz~10GHz_HSDPA_B4_HighCH1513-1752.6



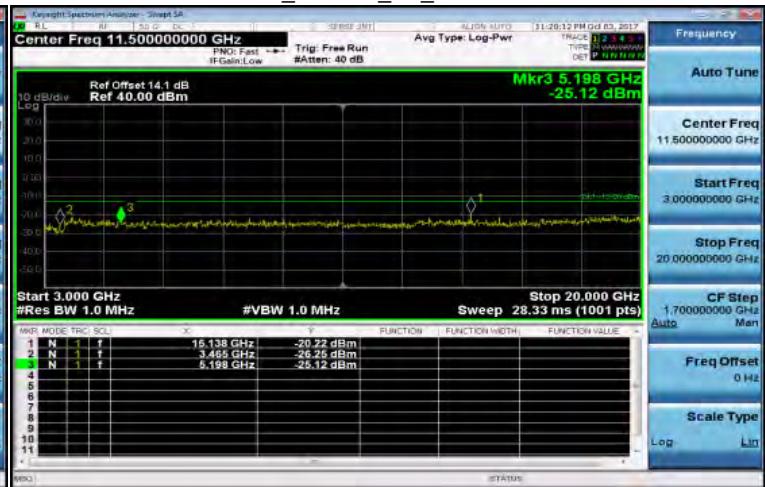
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30MHz~3GHz_HSUPA_B4_LowCH1312-1712.4



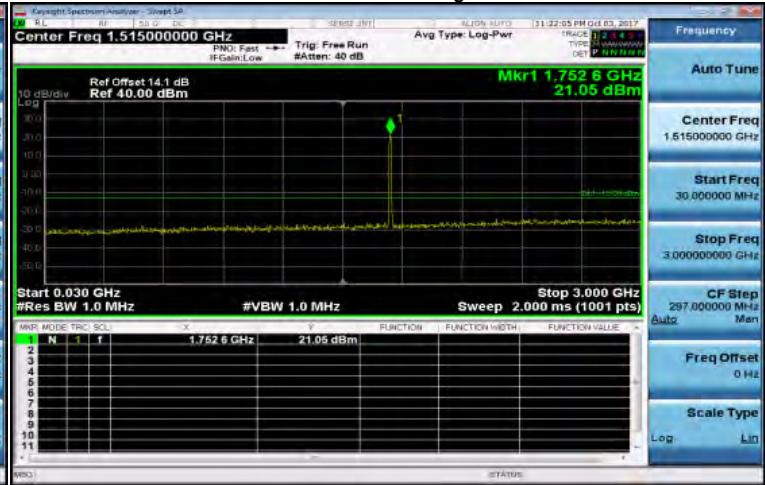
3GHz~10GHz_HSUPA_B4_MidCH1413-1732.6



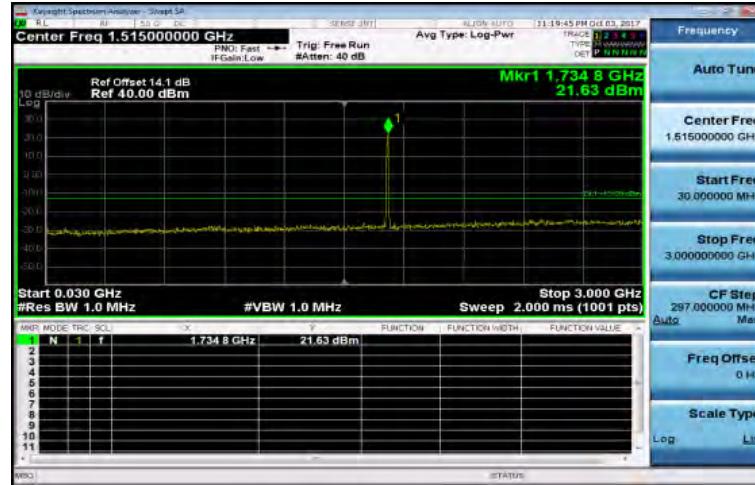
3GHz~10GHz_HSUPA_B4_LowCH1312-1712.4



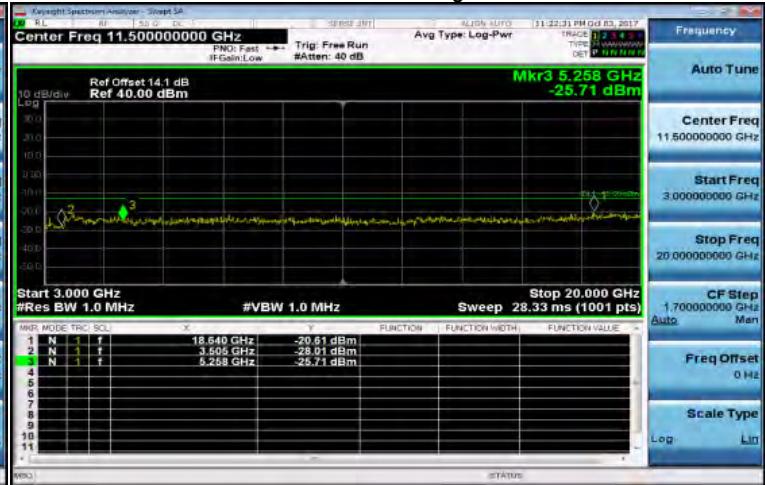
30MHz~3GHz_HSUPA_B4_HighCH1513-1752.6



30MHz~3GHz_HSUPA_B4_MidCH1413-1732.6



3GHz~10GHz_HSUPA_B4_HighCH1513-1752.6



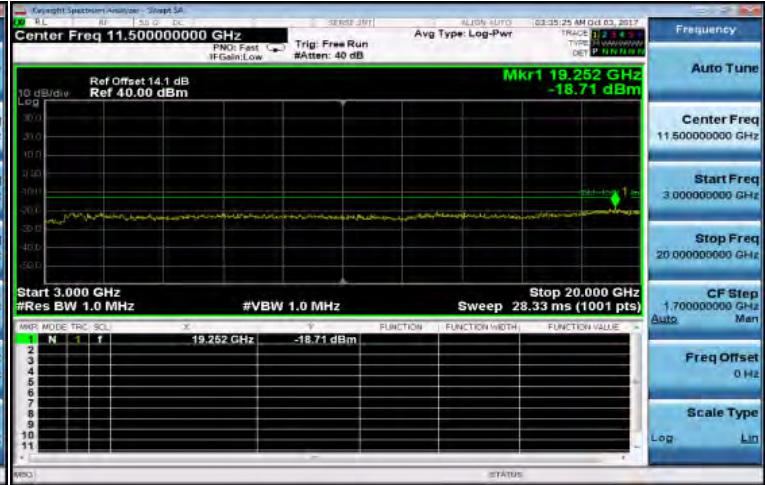
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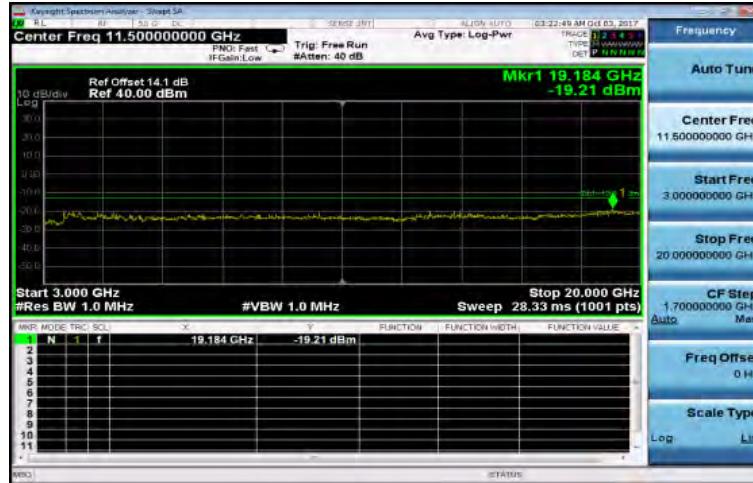
30MHz~3GHz_WCDMA_B2_LowCH9262-1852.4



3GHz~10GHz_WCDMA_B2_MidCH9400-1880



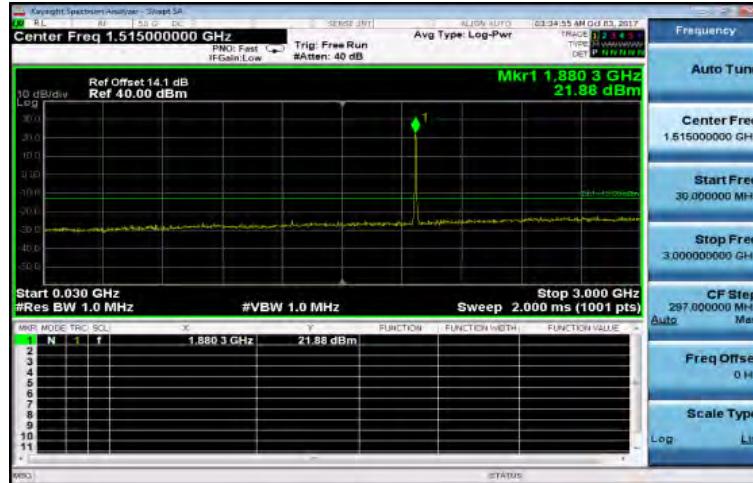
3GHz~10GHz_WCDMA_B2_LowCH9262-1852.4



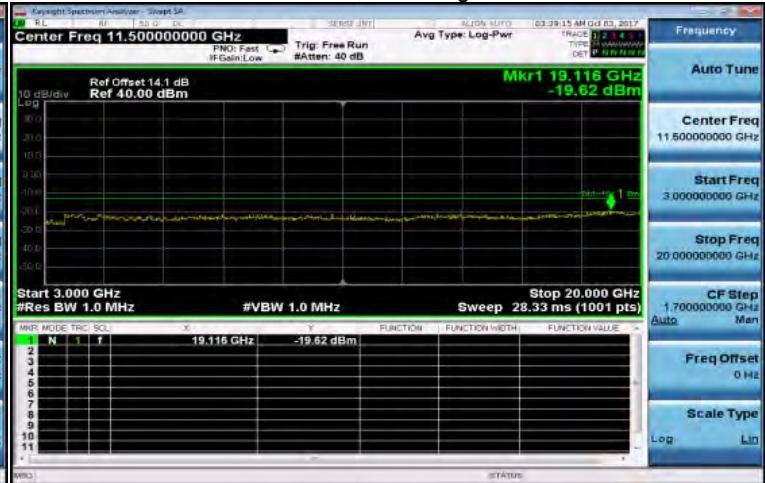
30MHz~3GHz_WCDMA_B2_HighCH9538-1907.6



30MHz~3GHz_WCDMA_B2_MidCH9400-1880



3GHz~10GHz_WCDMA_B2_HighCH9538-1907.6



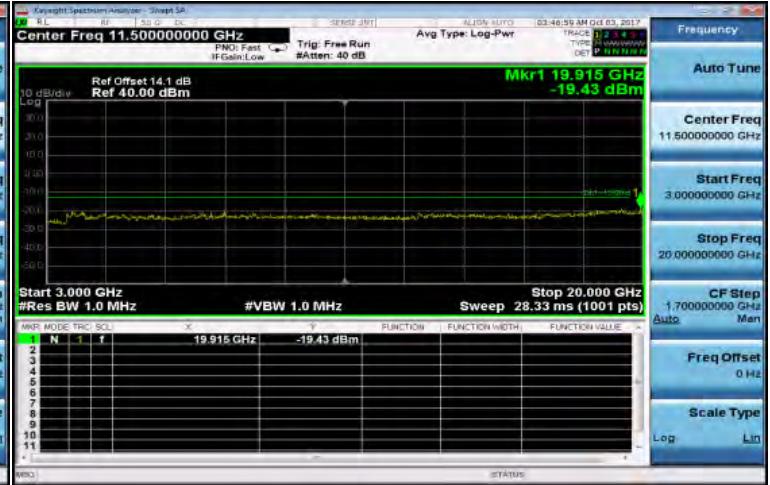
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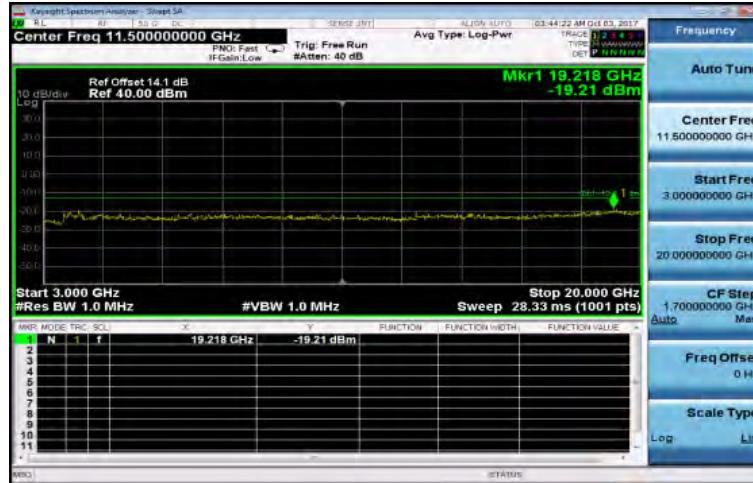
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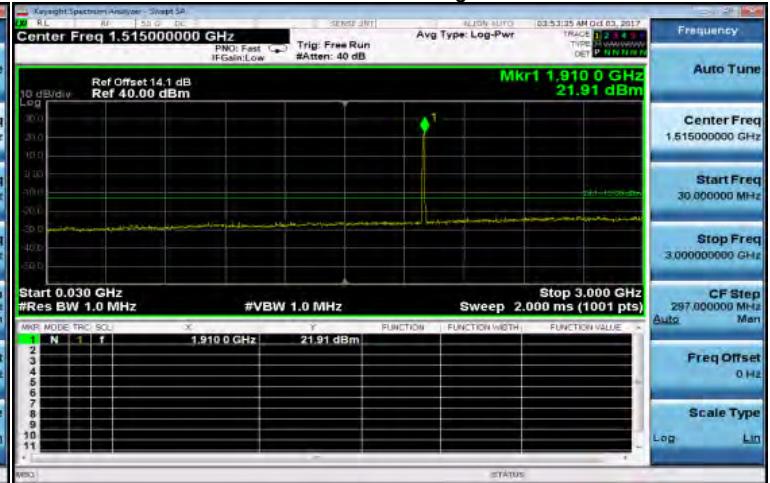
3GHz~10GHz_HSDPA_B2_MidCH9400-1880



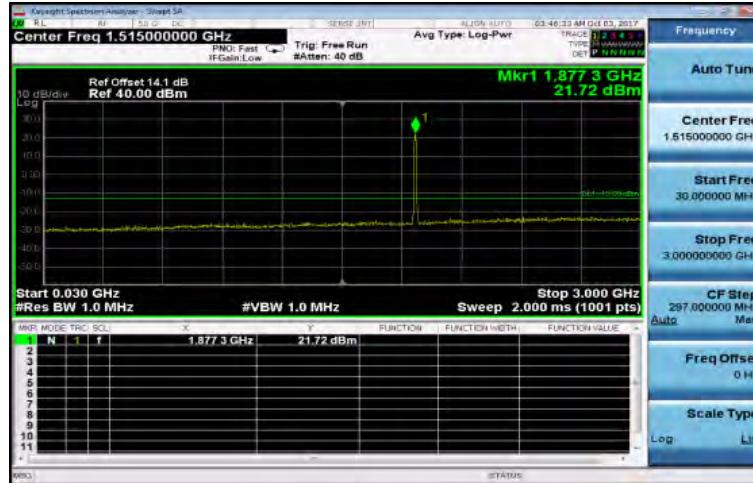
3GHz~10GHz_HSDPA_B2_LowCH9262-1852.4



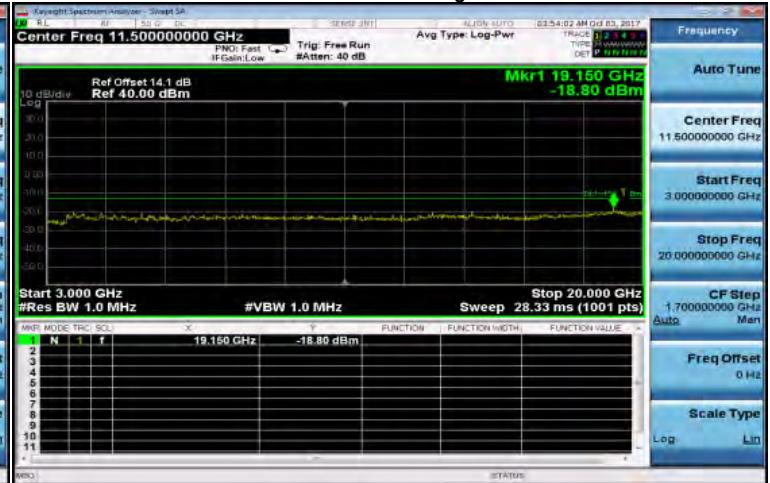
30MHz~3GHz_HSDPA_B2_HighCH9538-1907.6



30MHz~3GHz_HSDPA_B2_MidCH9400-1880



3GHz~10GHz_HSDPA_B2_HighCH9538-1907.6



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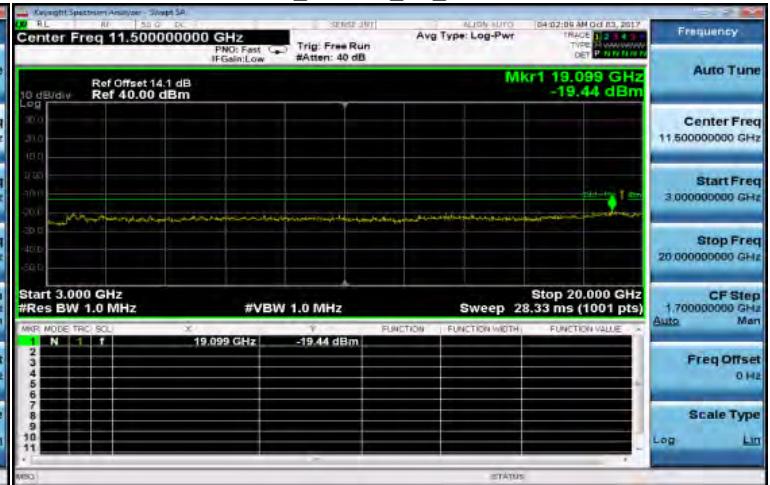
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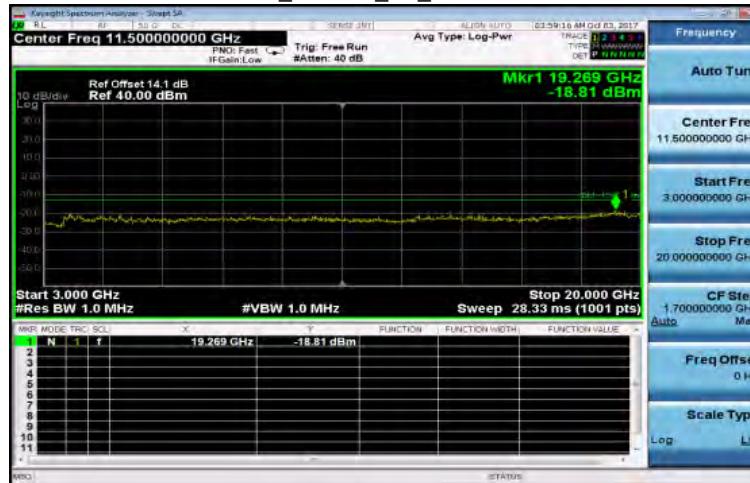
30MHz~3GHz_HSUPA_B2_LowCH9262-1852.4



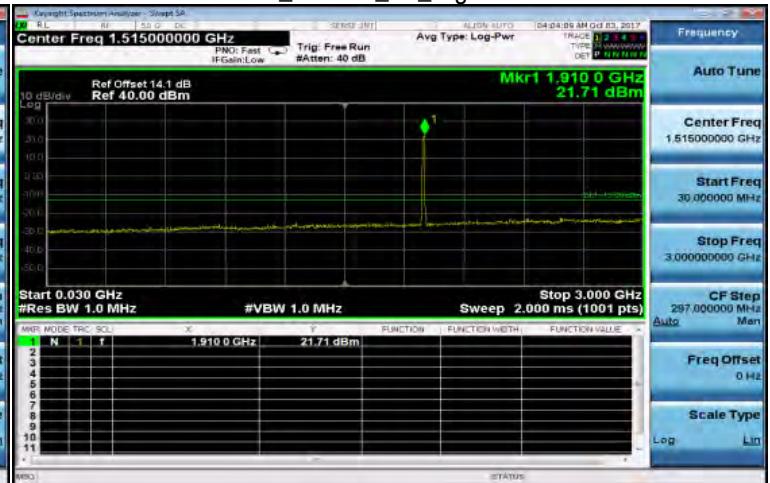
3GHz~10GHz_HSUPA_B2_MidCH9400-1880



3GHz~10GHz_HSUPA_B2_LowCH9262-1852.4



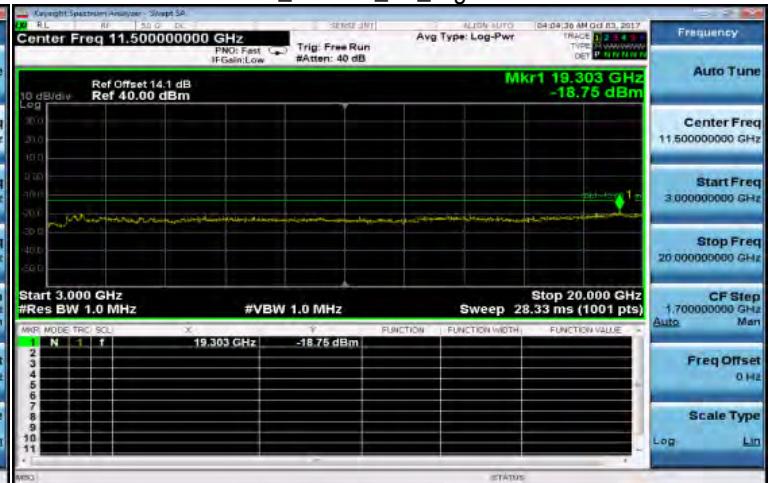
30MHz~3GHz_HSUPA_B2_HighCH9538-1907.6



30MHz~3GHz_HSUPA_B2_MidCH9400-1880



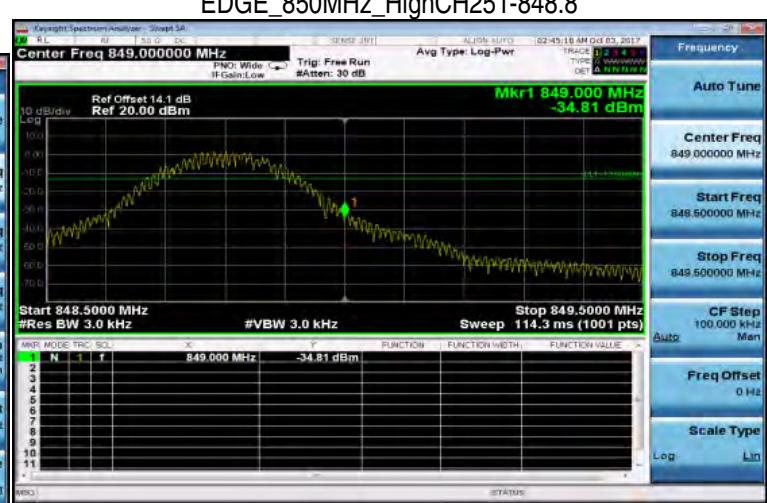
3GHz~10GHz_HSUPA_B2_HighCH9538-1907.6



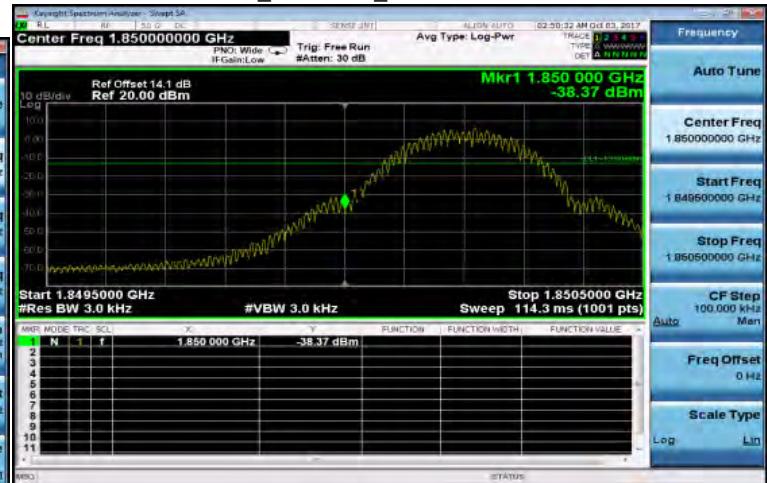
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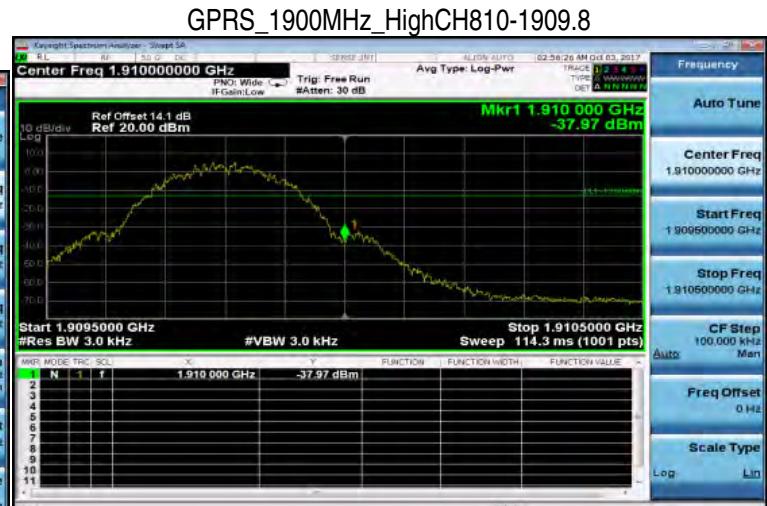
Band Edge
GPRS_850MHz_LowCH128-824.2



GPRS_850MHz_HighCH251-848.8



EDGE_850MHz_LowCH128-824.2



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EDGE_1900MHz_LowCH512-1850.2



WCDMA_B2_HighCH9538-1907.6



EDGE_1900MHz_HighCH810-1909.8



HSDPA_B2_LowCH9262-1852.4



WCDMA_B2_LowCH9262-1852.4



HSDPA_B2_HighCH9538-1907.6



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HSUPA_B2_LowCH9262-1852.4



WCDMA_B4_HighCH1513-1752.6



HSUPA_B2_HighCH9538-1907.6



HSDPA_B4_LowCH1312-1712.4



WCDMA_B4_LowCH1312-1712.4



HSDPA_B4_HighCH1513-1752.6



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HSUPA_B4_LowCH1312-1712.4



WCDMA_B5_HighCH4233-846.6



HSUPA_B4_HighCH1513-1752.6



HSDPA_B5_LowCH4132-826.4



WCDMA_B5_LowCH4132-826.4



HSDPA_B5_HighCH4233-846.6



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HSUPA_B5_LowCH4132-826.4



HSUPA_B5_HighCH4233-846.6



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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) , §27.53(g)(h) , 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 $43 + 10 \log_{10}(p)$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

FCC §27.53 (m) (4) shall not be less than $55 + 10 \log_{10}(p)$ (mean output power in watt) dBc below the mean power output outside a license's frequency block (-25dBm).

Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)$ ^{Note}
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)$ ^{Note}
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

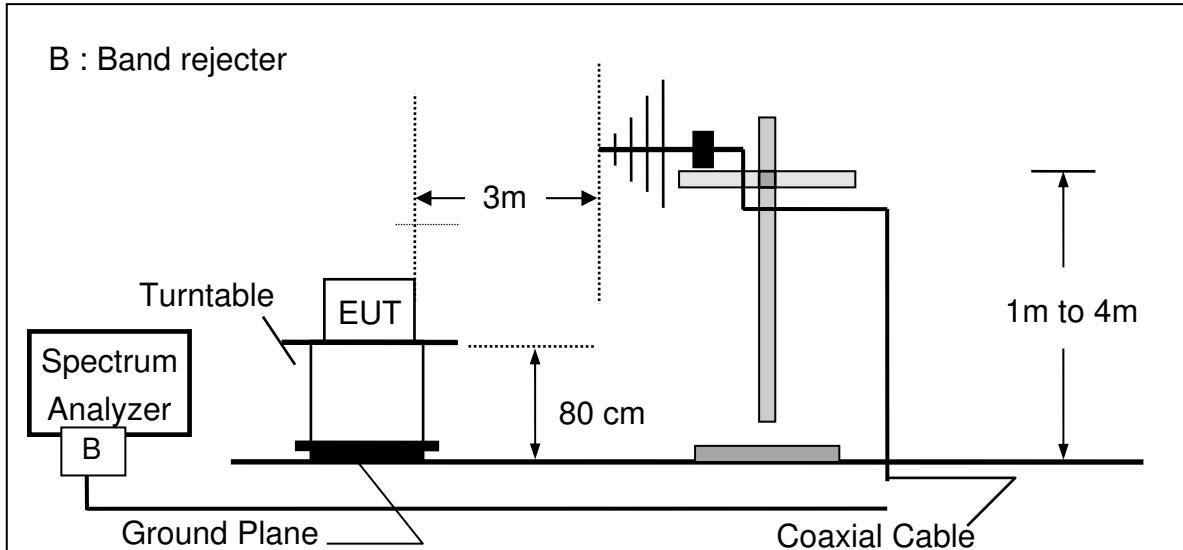
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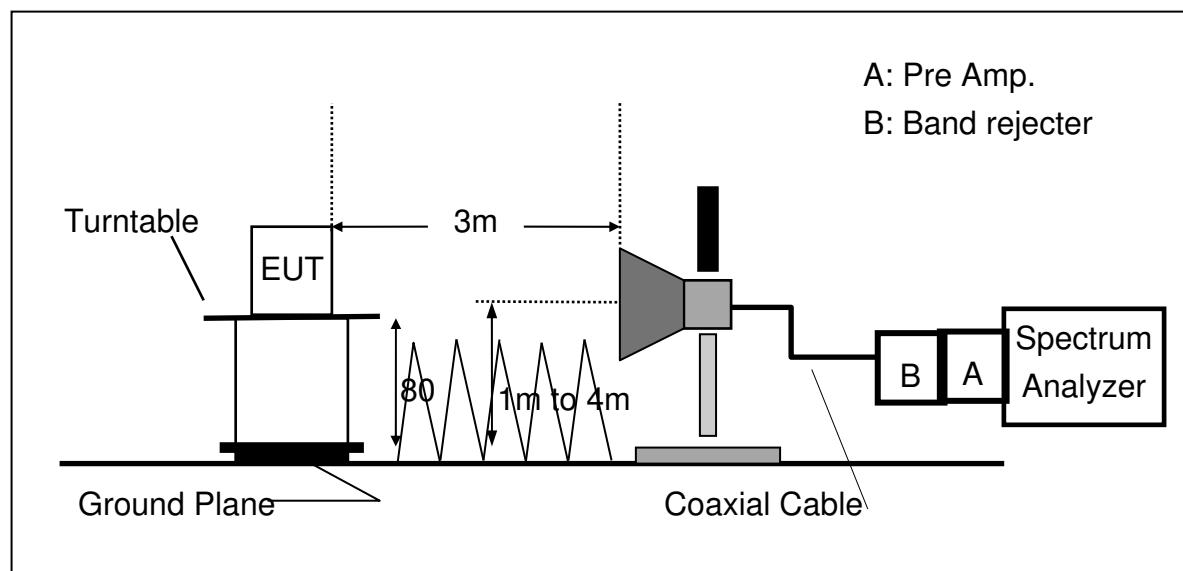
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10.2. EUT Setup

Radiated Emission Test Set-Up, Frequency Below 1000MHz



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.

$$\text{ERP (dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

$$\text{EIRP (dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBi)} + \text{Cable Loss(dB)}$$

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:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2017	09/19/2018
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2017	01/02/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/13/2016	12/12/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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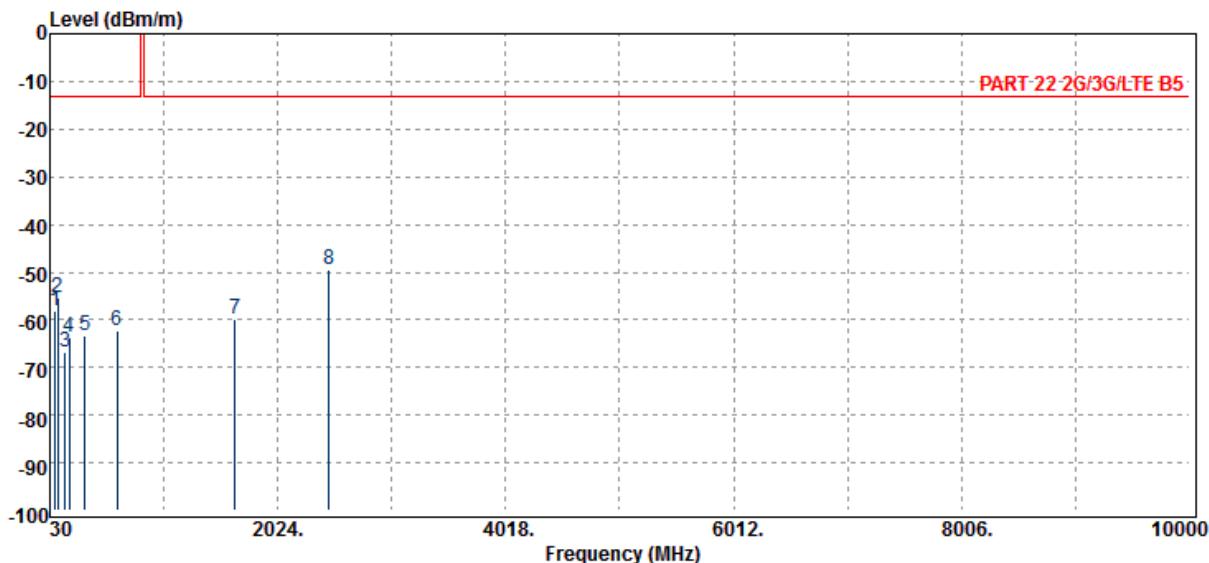
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10.5. Measurement Result:

Radiated Spurious Emission Measurement Result: EDGE 850 Mode (The Worst Case)

Operation Band :EDGE 850 Temp./Humi. :24 deg_C / 61 RH
 Fundamental Frequency :824.2 MHz Engineer :Kane
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Pol.
 Antenna :VERTICAL



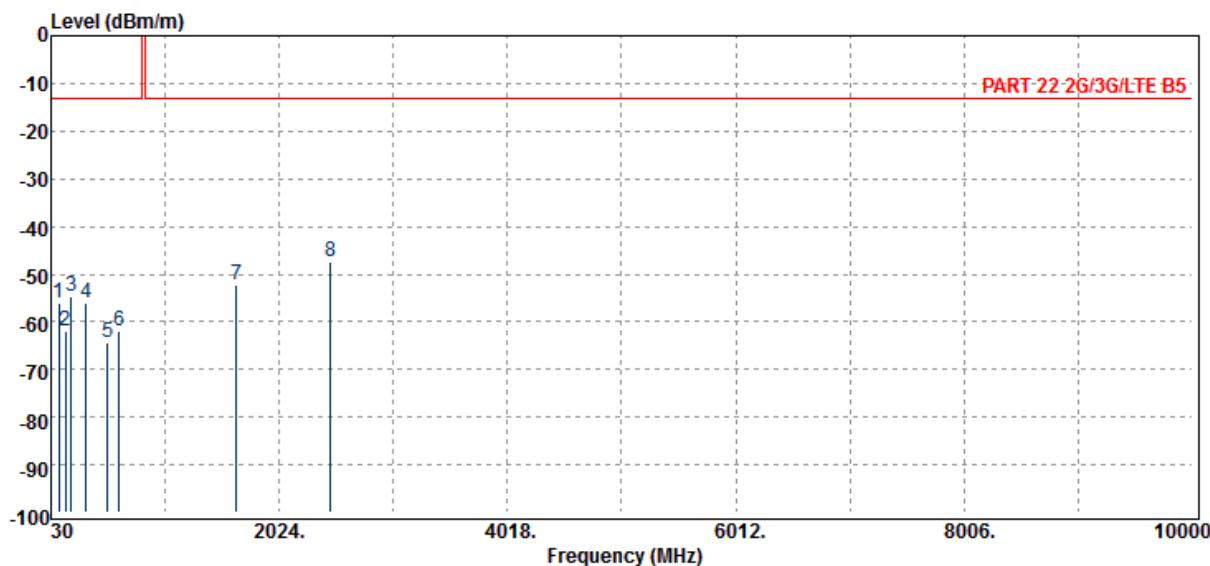
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
76.56	S	-58.29	-53.28	-3.87	-1.14	-13.00	-45.29
95.96	S	-55.34	-52.95	-1.16	-1.23	-13.00	-42.34
159.98	S	-66.66	-63.55	-1.64	-1.48	-13.00	-53.66
202.66	S	-63.51	-65.08	3.22	-1.65	-13.00	-50.51
335.55	S	-63.18	-65.04	3.80	-1.93	-13.00	-50.18
618.79	S	-62.35	-63.00	3.20	-2.56	-13.00	-49.35
1648.40	H	-59.70	-64.74	9.26	-4.22	-13.00	-46.70
2472.60	H	-49.60	-55.26	10.88	-5.22	-13.00	-36.60

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Operation Band :EDGE 850
 Fundamental Frequency :824.2 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



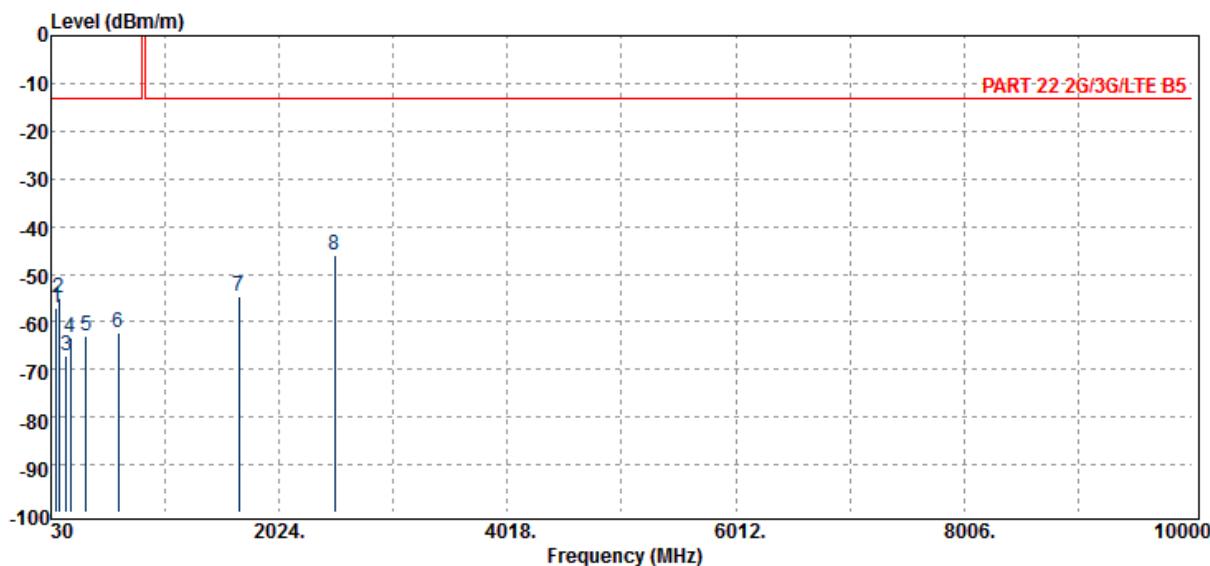
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	Antenna Gain dBd				
94.99	S	-55.94	-53.67	-1.04	-1.23	-13.00	-42.94	
159.01	S	-61.94	-58.79	-1.68	-1.47	-13.00	-48.94	
204.60	S	-54.67	-56.32	3.30	-1.65	-13.00	-41.67	
335.55	S	-56.14	-58.01	3.80	-1.93	-13.00	-43.14	
526.64	S	-64.29	-65.54	3.71	-2.46	-13.00	-51.29	
624.61	S	-62.09	-62.78	3.19	-2.51	-13.00	-49.09	
1648.40	H	-52.27	-57.31	9.26	-4.22	-13.00	-39.27	
2472.60	H	-47.29	-52.95	10.88	-5.22	-13.00	-34.29	

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Operation Band :EDGE 850
 Fundamental Frequency :836.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



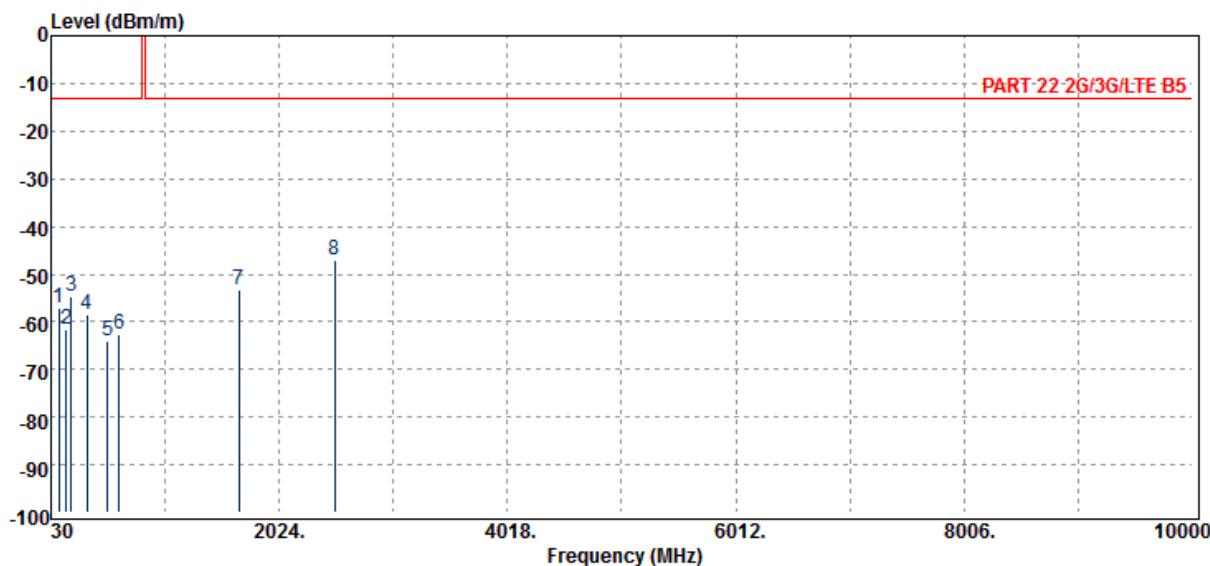
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
76.56	S	-57.05	-52.04	-3.87	-1.14	-13.00	-44.05
95.96	S	-54.95	-52.56	-1.16	-1.23	-13.00	-41.95
159.98	S	-66.97	-63.85	-1.64	-1.48	-13.00	-53.97
201.69	S	-63.30	-64.83	3.17	-1.64	-13.00	-50.30
335.55	S	-62.87	-64.73	3.80	-1.93	-13.00	-49.87
616.85	S	-62.24	-62.87	3.21	-2.58	-13.00	-49.24
1673.20	H	-54.78	-59.84	9.35	-4.29	-13.00	-41.78
2509.80	H	-45.91	-51.56	10.91	-5.26	-13.00	-32.91

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Operation Band :EDGE 850
 Fundamental Frequency :836.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



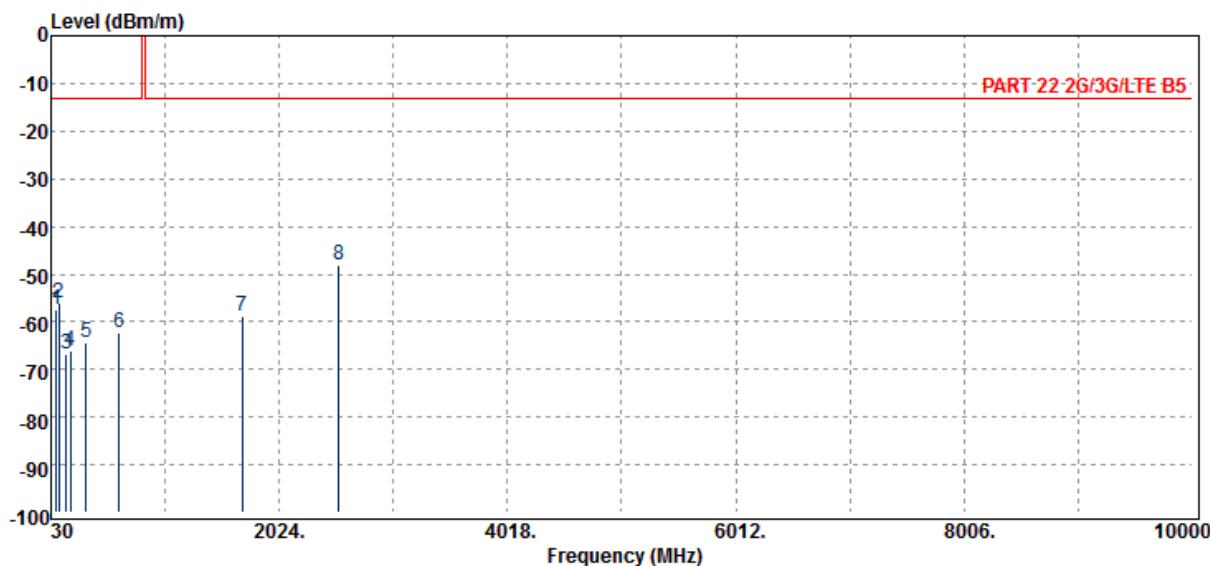
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
96.93	S	-57.15	-54.65	-1.27	-1.24	-13.00	-44.15
159.98	S	-61.61	-58.50	-1.64	-1.48	-13.00	-48.61
204.60	S	-54.84	-56.48	3.30	-1.65	-13.00	-41.84
343.31	S	-58.33	-60.17	3.83	-1.99	-13.00	-45.33
521.79	S	-64.04	-65.36	3.74	-2.41	-13.00	-51.04
623.64	S	-62.76	-63.44	3.19	-2.52	-13.00	-49.76
1673.20	H	-53.15	-58.21	9.35	-4.29	-13.00	-40.15
2509.80	H	-46.96	-52.61	10.91	-5.26	-13.00	-33.96

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Operation Band :EDGE 850
 Fundamental Frequency :848.8 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



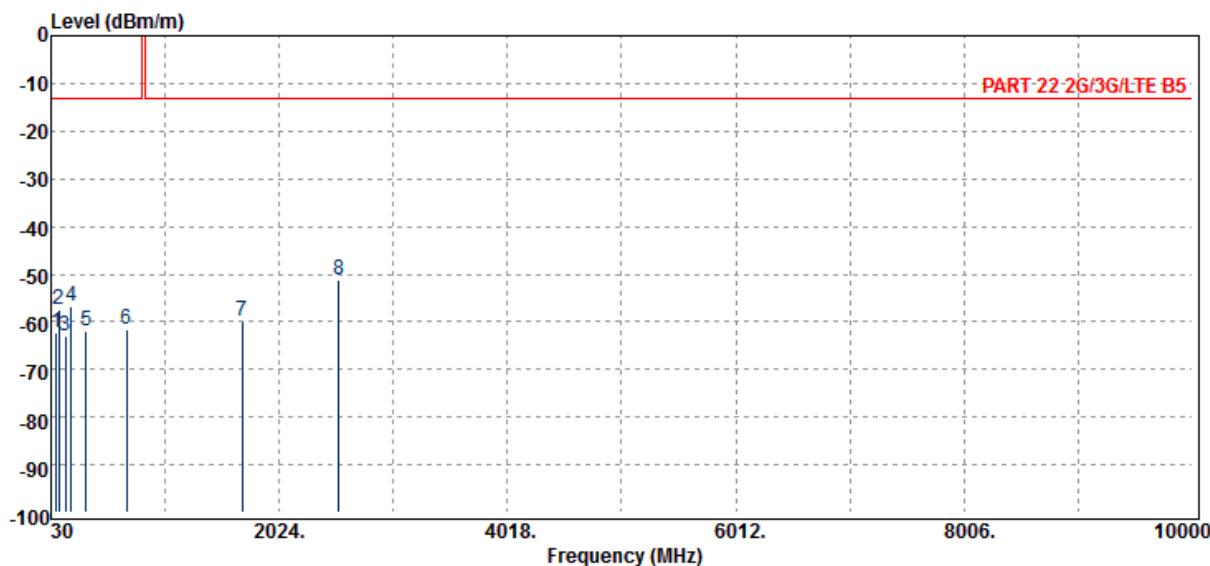
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
76.56	S	-57.43	-52.42	-3.87	-1.14	-13.00	-44.43
95.96	S	-56.15	-53.76	-1.16	-1.23	-13.00	-43.15
159.98	S	-66.90	-63.78	-1.64	-1.48	-13.00	-53.90
202.66	S	-66.23	-67.81	3.22	-1.65	-13.00	-53.23
337.49	S	-64.21	-66.07	3.80	-1.95	-13.00	-51.21
628.49	S	-62.30	-63.01	3.18	-2.47	-13.00	-49.30
1697.60	H	-58.83	-63.96	9.43	-4.31	-13.00	-45.83
2546.40	H	-48.26	-53.89	10.96	-5.33	-13.00	-35.26

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Operation Band :EDGE 850
 Fundamental Frequency :848.8 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. Engineer :24 deg_C / 61 RH
 Measurement Pol. Antenna :HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
75.59	S	-62.28	-56.99	-4.16	-1.14	-13.00	-49.28	
94.99	S	-57.36	-55.08	-1.04	-1.23	-13.00	-44.36	
159.01	S	-62.81	-59.66	-1.68	-1.47	-13.00	-49.81	
204.60	S	-56.74	-58.38	3.30	-1.65	-13.00	-43.74	
336.52	S	-62.06	-63.92	3.80	-1.94	-13.00	-49.06	
692.51	S	-61.51	-61.76	3.09	-2.84	-13.00	-48.51	
1697.60	H	-59.70	-64.83	9.43	-4.31	-13.00	-46.70	
2546.40	H	-51.12	-56.75	10.96	-5.33	-13.00	-38.12	

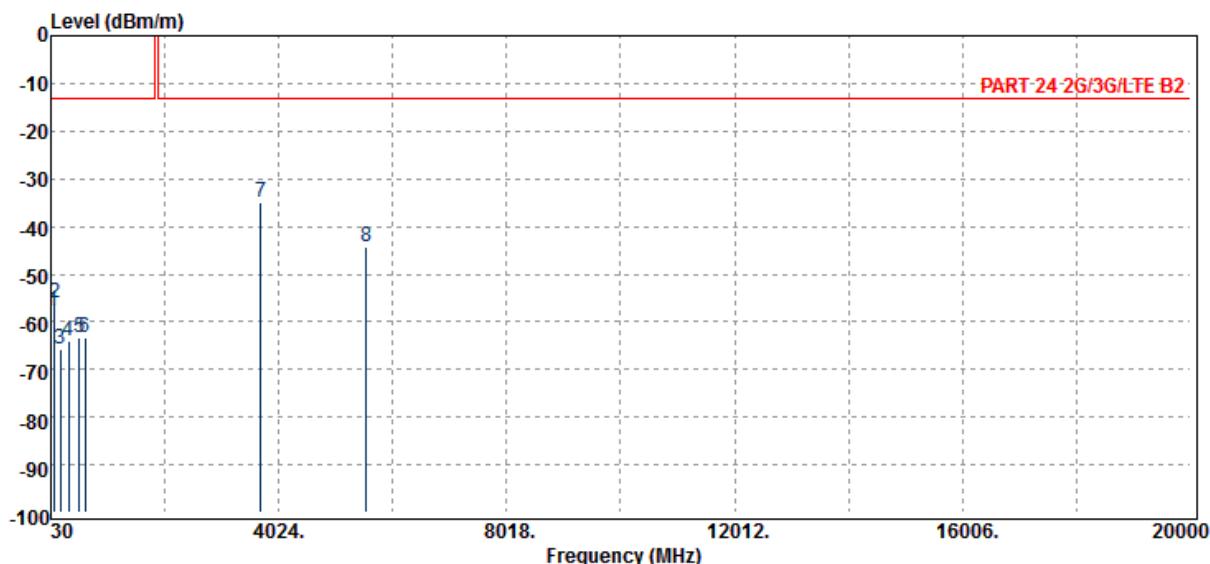
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Radiated Spurious Emission Measurement Result: GPRS 1900 Mode (The Worst Case)

Operation Band :GPRS 1900 Temp./Humi. :22 deg_C / 62 RH
 Fundamental Frequency :1850.2 MHz Engineer :Kane
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Pol. Antenna :VERTICAL



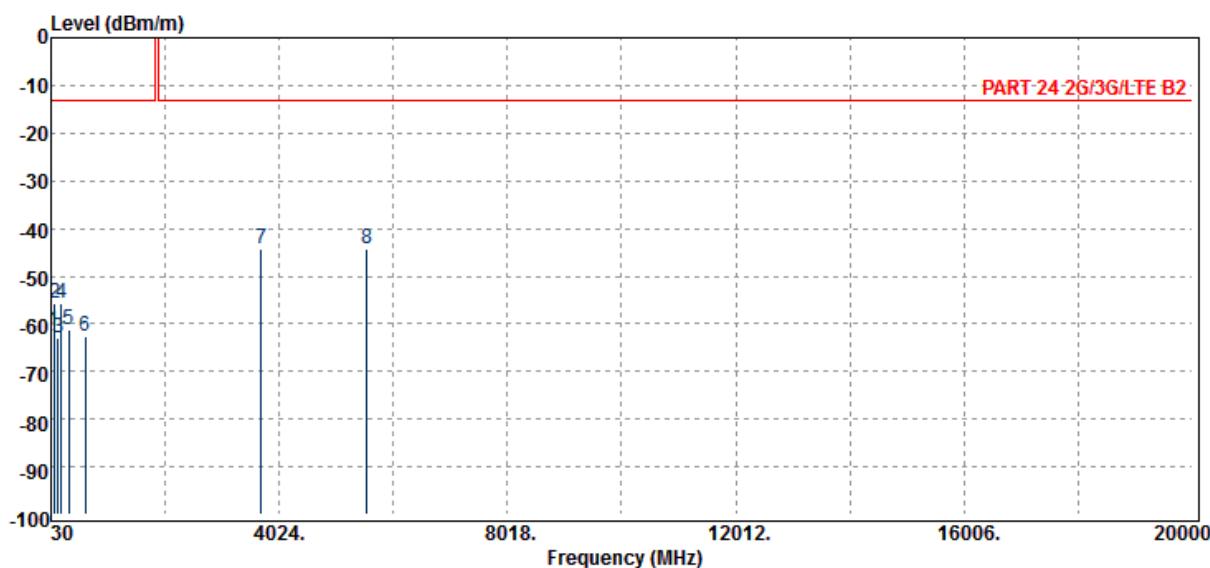
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
74.62	S	-57.79	-52.21	-52.21	-4.45	-1.13	-13.00	-44.79
95.96	S	-56.15	-53.76	-53.76	-1.16	-1.23	-13.00	-43.15
202.66	S	-65.75	-67.32	-67.32	3.22	-1.65	-13.00	-52.75
343.31	S	-63.84	-65.68	-65.68	3.83	-1.99	-13.00	-50.84
521.79	S	-63.43	-64.76	-64.76	3.74	-2.41	-13.00	-50.43
633.34	S	-63.27	-63.99	-63.99	3.17	-2.46	-13.00	-50.27
3700.40	H	-35.08	-40.94	-40.94	12.44	-6.58	-13.00	-22.08
5550.60	H	-44.44	-49.10	-49.10	12.90	-8.24	-13.00	-31.44

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Operation Band :GPRS 1900
 Fundamental Frequency :1850.2 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



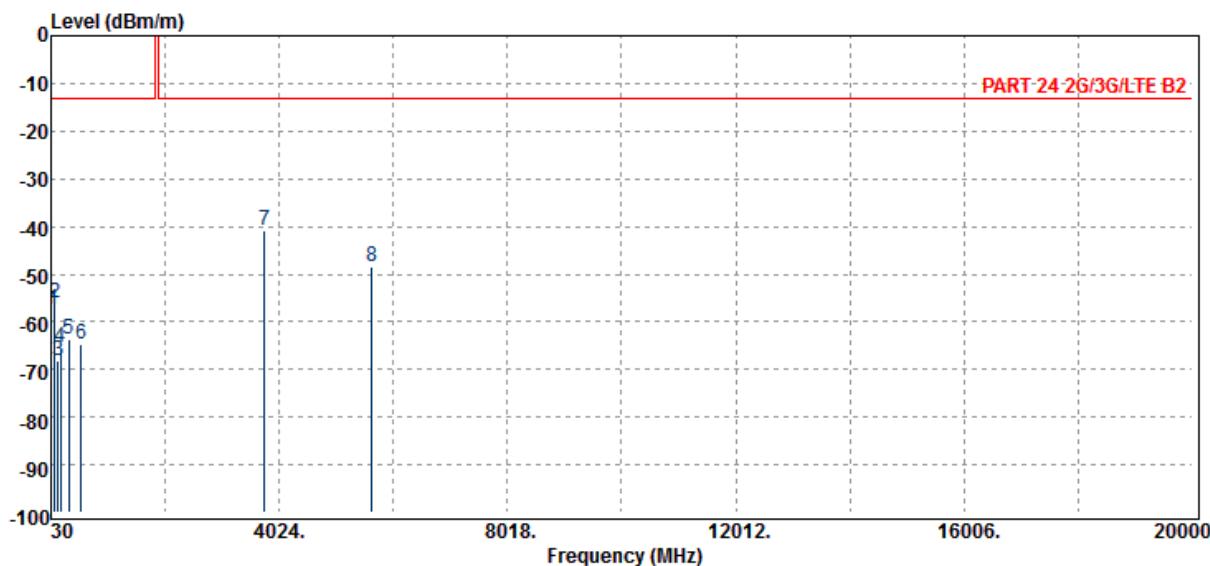
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
74.62	S	-61.57	-55.98	-4.45	-1.13	-13.00	-48.57	
95.96	S	-55.79	-53.40	-1.16	-1.23	-13.00	-42.79	
159.98	S	-63.04	-59.93	-1.64	-1.48	-13.00	-50.04	
204.60	S	-55.58	-57.23	3.30	-1.65	-13.00	-42.58	
336.52	S	-61.41	-63.27	3.80	-1.94	-13.00	-48.41	
624.61	S	-62.50	-63.18	3.19	-2.51	-13.00	-49.50	
3700.40	H	-44.20	-50.07	12.44	-6.58	-13.00	-31.20	
5550.60	H	-44.14	-48.80	12.90	-8.24	-13.00	-31.14	

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Operation Band :GPRS 1900
 Fundamental Frequency :1880 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



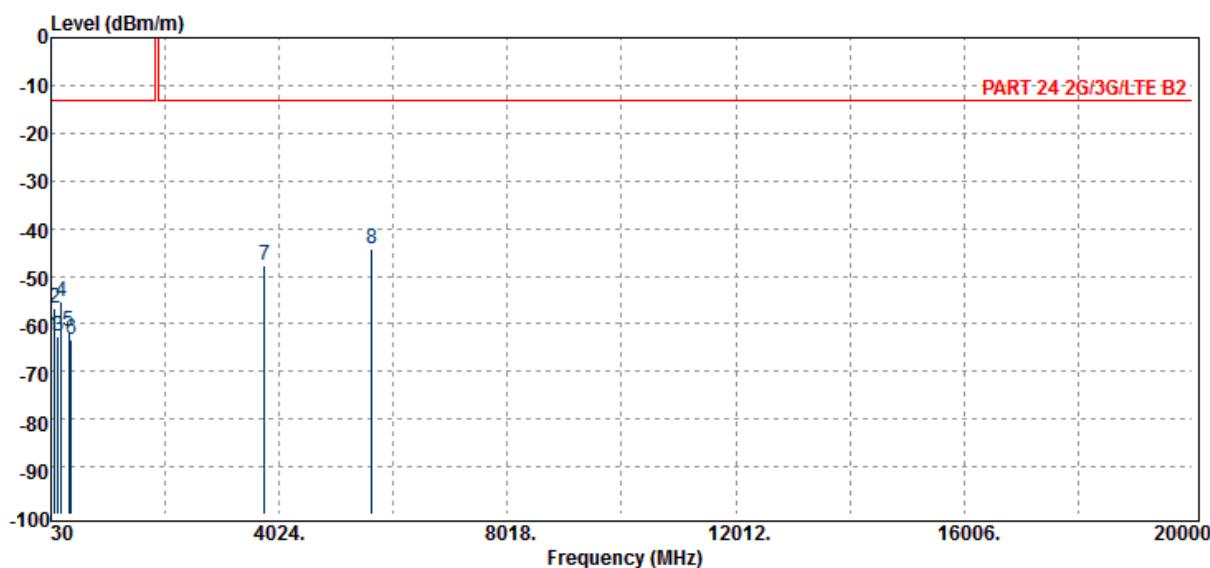
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	Antenna Gain dBd				
75.59	S	-57.41	-52.12	-4.16	-1.14	-13.00	-44.41	
95.96	S	-56.02	-53.63	-1.16	-1.23	-13.00	-43.02	
159.98	S	-68.02	-64.90	-1.64	-1.48	-13.00	-55.02	
202.66	S	-65.49	-67.06	3.22	-1.65	-13.00	-52.49	
335.55	S	-63.73	-65.60	3.80	-1.93	-13.00	-50.73	
563.50	S	-64.76	-65.49	3.49	-2.76	-13.00	-51.76	
3760.00	H	-40.66	-46.52	12.45	-6.60	-13.00	-27.66	
5640.00	H	-48.37	-52.91	12.90	-8.36	-13.00	-35.37	

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Operation Band :GPRS 1900
 Fundamental Frequency :1880 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



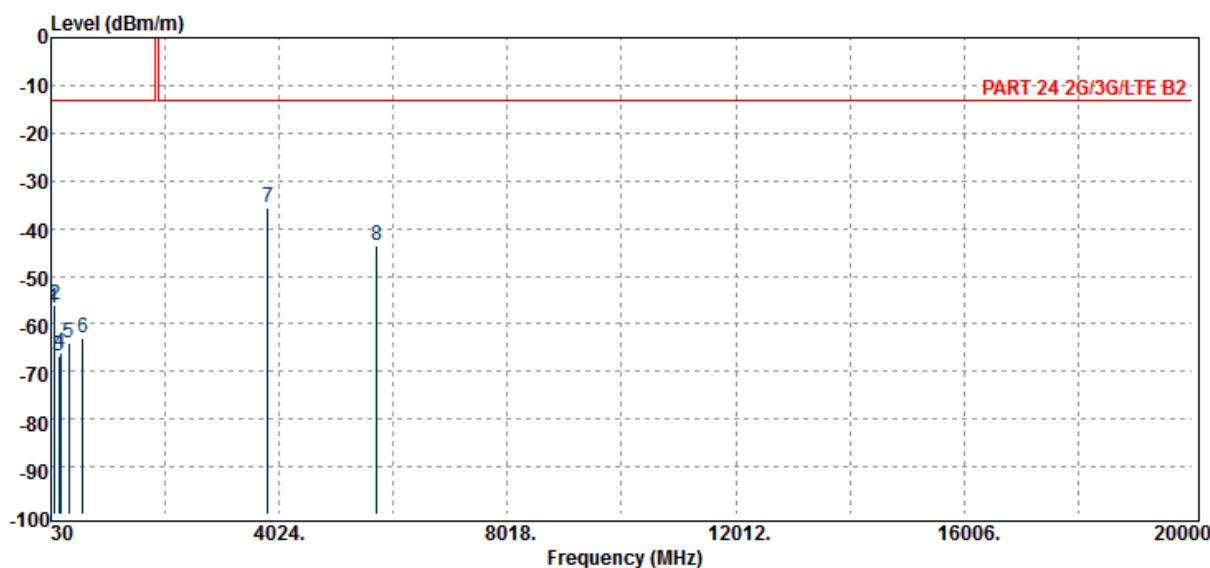
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	Antenna Gain dBd				
74.62	S	-62.50	-56.92	-4.45	-1.13	-13.00	-49.50	
95.96	S	-56.69	-54.30	-1.16	-1.23	-13.00	-43.69	
159.98	S	-62.77	-59.66	-1.64	-1.48	-13.00	-49.77	
204.60	S	-55.31	-56.96	3.30	-1.65	-13.00	-42.31	
337.49	S	-61.52	-63.38	3.80	-1.95	-13.00	-48.52	
377.26	S	-63.22	-64.82	3.84	-2.24	-13.00	-50.22	
3760.00	H	-47.69	-53.54	12.45	-6.60	-13.00	-34.69	
5640.00	H	-44.33	-48.87	12.90	-8.36	-13.00	-31.33	

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Operation Band :GPRS 1900
 Fundamental Frequency :1909.8 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :VERTICAL



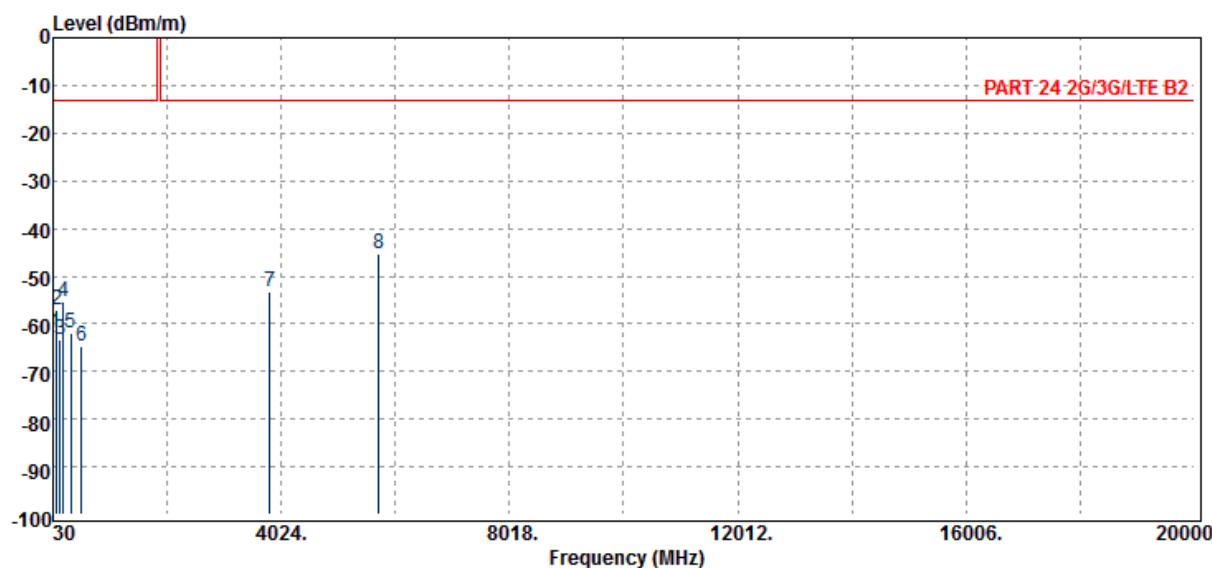
Freq. MHz	Note	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			F/H/E/S	Output Level dBm				
75.59	S	-56.90		-51.60	-4.16	-1.14	-13.00	-43.90
95.96	S	-56.10		-53.71	-1.16	-1.23	-13.00	-43.10
160.95	S	-66.76		-63.72	-1.57	-1.48	-13.00	-53.76
202.66	S	-66.13		-67.70	3.22	-1.65	-13.00	-53.13
335.55	S	-63.89		-65.75	3.80	-1.93	-13.00	-50.89
587.75	S	-63.13		-63.66	3.32	-2.79	-13.00	-50.13
3819.60	H	-35.62		-41.43	12.47	-6.65	-13.00	-22.62
5729.40	H	-43.57		-48.07	12.90	-8.39	-13.00	-30.57

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Operation Band :GPRS 1900
 Fundamental Frequency :1909.8 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



Freq. MHz	Note	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit	Margin
						dBm	dB
75.59	S	-62.10	-56.80	-4.16	-1.14	-13.00	-49.10
95.96	S	-56.94	-54.55	-1.16	-1.23	-13.00	-43.94
159.98	S	-63.35	-60.24	-1.64	-1.48	-13.00	-50.35
204.60	S	-55.50	-57.15	3.30	-1.65	-13.00	-42.50
335.55	S	-61.85	-63.71	3.80	-1.93	-13.00	-48.85
521.79	S	-64.61	-65.94	3.74	-2.41	-13.00	-51.61
3819.60	H	-53.17	-58.99	12.47	-6.65	-13.00	-40.17
5729.40	H	-45.43	-49.94	12.90	-8.39	-13.00	-32.43

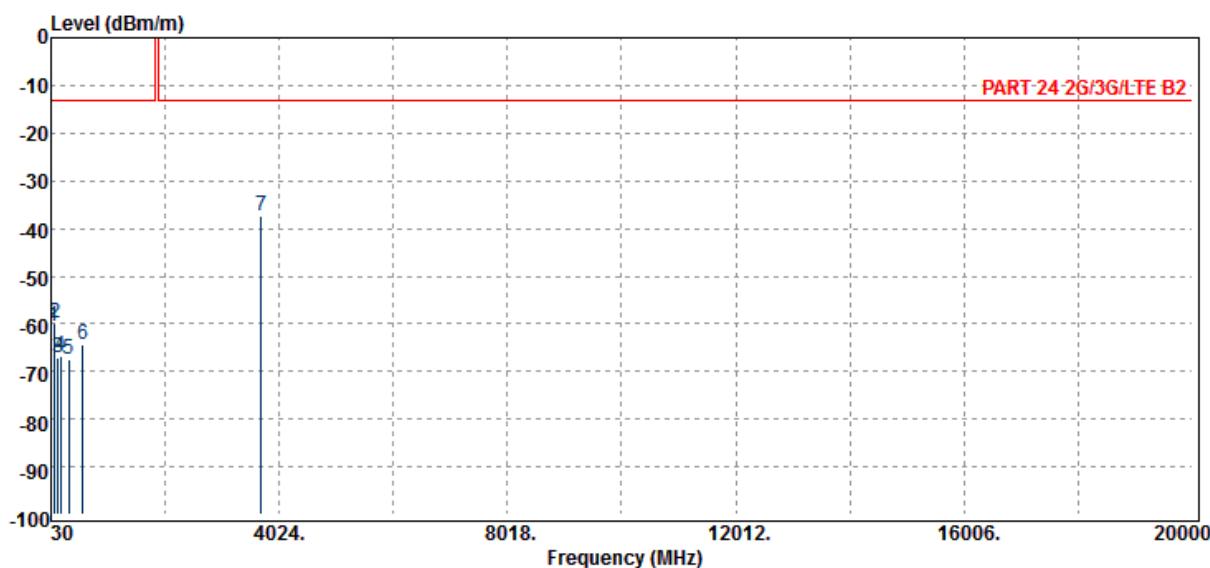
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Radiated Spurious Emission Measurement Result: WCDMA Band 2 Mode (The Worst Case)

Operation Band :WCDMA B2 Temp./Humi. :22 deg_C / 62 RH
 Fundamental Frequency :1852.4 MHz Engineer :Kane
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Pol. Antenna :VERTICAL



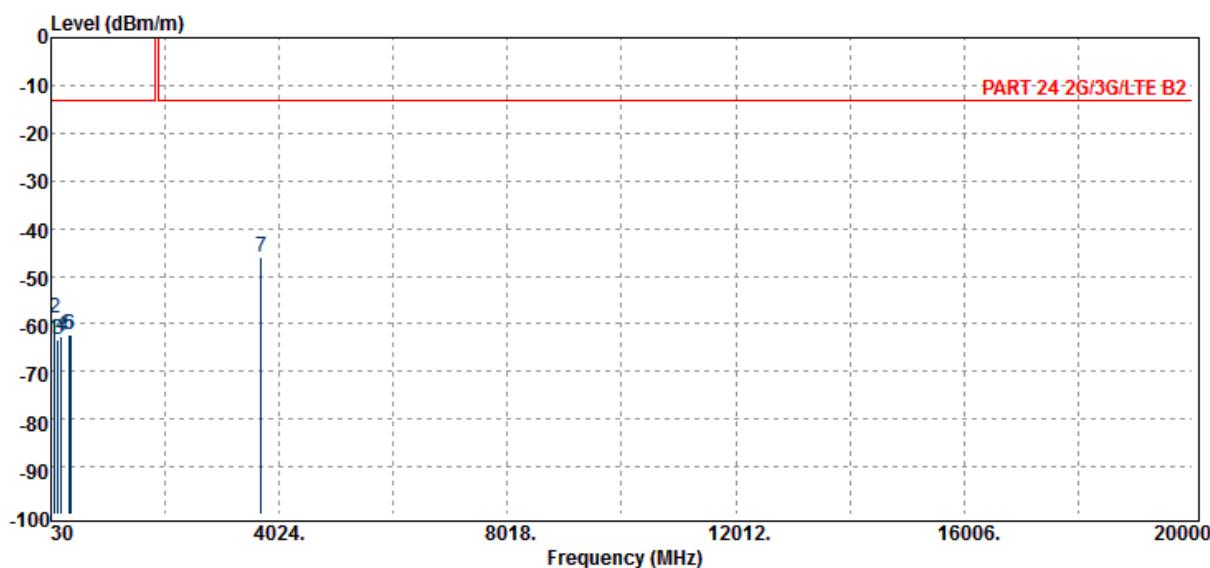
Freq. MHz	Note	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
78.50	S	-60.44	-55.99	-3.29	-1.15	-13.00	-47.44
94.02	S	-59.86	-57.71	-0.93	-1.22	-13.00	-46.86
159.01	S	-67.15	-64.00	-1.68	-1.47	-13.00	-54.15
202.66	S	-66.78	-68.35	3.22	-1.65	-13.00	-53.78
345.25	S	-67.61	-69.44	3.84	-2.01	-13.00	-54.61
584.84	S	-64.46	-65.01	3.34	-2.79	-13.00	-51.46
3704.80	H	-37.41	-43.27	12.44	-6.58	-13.00	-24.41

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Operation Band :WCDMA B2
 Fundamental Frequency :1852.4 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



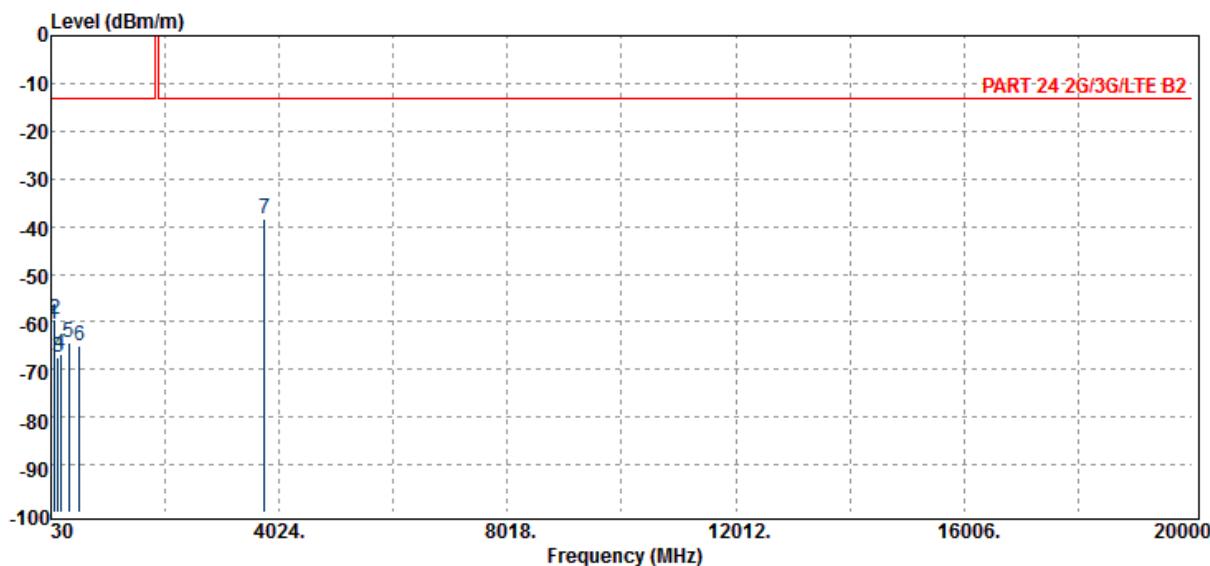
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-63.22	-57.92	-4.16	-1.14	-13.00	-50.22
95.96	S	-58.71	-56.33	-1.16	-1.23	-13.00	-45.71
159.98	S	-63.49	-60.38	-1.64	-1.48	-13.00	-50.49
204.60	S	-62.54	-64.19	3.30	-1.65	-13.00	-49.54
335.55	S	-62.19	-64.06	3.80	-1.93	-13.00	-49.19
366.59	S	-62.44	-64.11	3.85	-2.17	-13.00	-49.44
3704.80	H	-46.02	-51.88	12.44	-6.58	-13.00	-33.02

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Operation Band :WCDMA B2
 Fundamental Frequency :1880 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



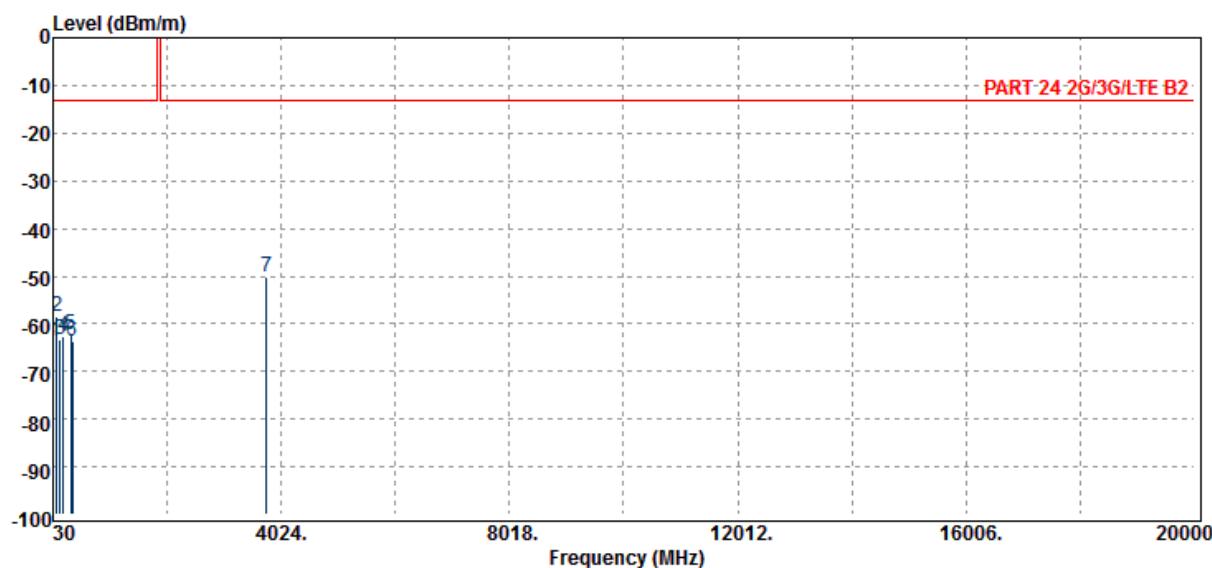
Freq. MHz	Note	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-60.48	-55.19	-4.16	-1.14	-13.00	-47.48
94.99	S	-59.64	-57.37	-1.04	-1.23	-13.00	-46.64
159.01	S	-67.48	-64.32	-1.68	-1.47	-13.00	-54.48
202.66	S	-66.65	-68.22	3.22	-1.65	-13.00	-53.65
333.61	S	-64.37	-66.25	3.79	-1.92	-13.00	-51.37
524.70	S	-64.96	-66.24	3.72	-2.44	-13.00	-51.96
3760.00	H	-38.40	-44.25	12.45	-6.60	-13.00	-25.40

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Operation Band :WCDMA B2
 Fundamental Frequency :1880 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



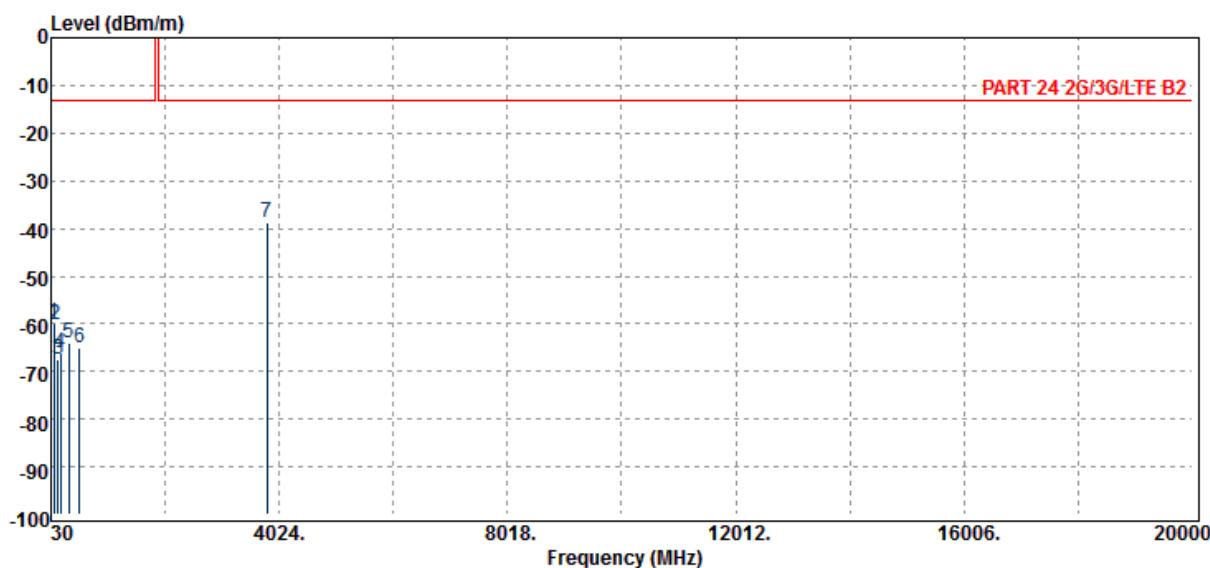
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
75.59	S	-63.58	-58.28	-4.16	-1.14	-13.00	-50.58	
95.96	S	-58.54	-56.15	-1.16	-1.23	-13.00	-45.54	
159.98	S	-63.40	-60.28	-1.64	-1.48	-13.00	-50.40	
214.30	S	-62.76	-64.52	3.44	-1.68	-13.00	-49.76	
337.49	S	-62.16	-64.02	3.80	-1.95	-13.00	-49.16	
366.59	S	-63.72	-65.39	3.85	-2.17	-13.00	-50.72	
3760.00	H	-50.15	-56.01	12.45	-6.60	-13.00	-37.15	

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Operation Band :WCDMA B2
 Fundamental Frequency :1907.6 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



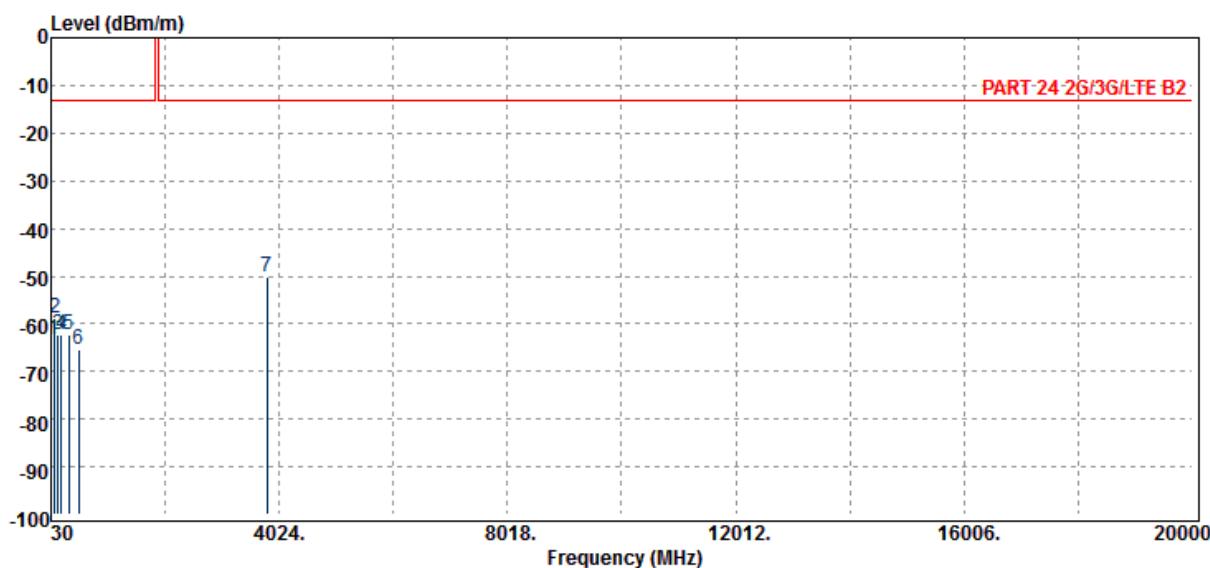
Freq. MHz	Note	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			F/H/E/S	Output Level dBm				
75.59	S	-59.90		-54.61	-4.16	-1.14	-13.00	-46.90
93.05	S	-60.12		-58.09	-0.81	-1.22	-13.00	-47.12
159.01	S	-67.58		-64.43	-1.68	-1.47	-13.00	-54.58
202.66	S	-66.12		-67.69	3.22	-1.65	-13.00	-53.12
336.52	S	-63.95		-65.81	3.80	-1.94	-13.00	-50.95
526.64	S	-65.08		-66.33	3.71	-2.46	-13.00	-52.08
3815.20	H	-38.71		-44.54	12.46	-6.63	-13.00	-25.71

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Operation Band :WCDMA B2
 Fundamental Frequency :1907.6 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



Freq. MHz	Note	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-63.28	-57.98	-4.16	-1.14	-13.00	-50.28
94.99	S	-58.66	-56.39	-1.04	-1.23	-13.00	-45.66
159.98	S	-62.32	-59.20	-1.64	-1.48	-13.00	-49.32
217.21	S	-62.19	-63.88	3.38	-1.69	-13.00	-49.19
336.52	S	-62.25	-64.11	3.80	-1.94	-13.00	-49.25
519.85	S	-65.40	-66.75	3.75	-2.39	-13.00	-52.40
3815.20	H	-50.04	-55.87	12.46	-6.63	-13.00	-37.04

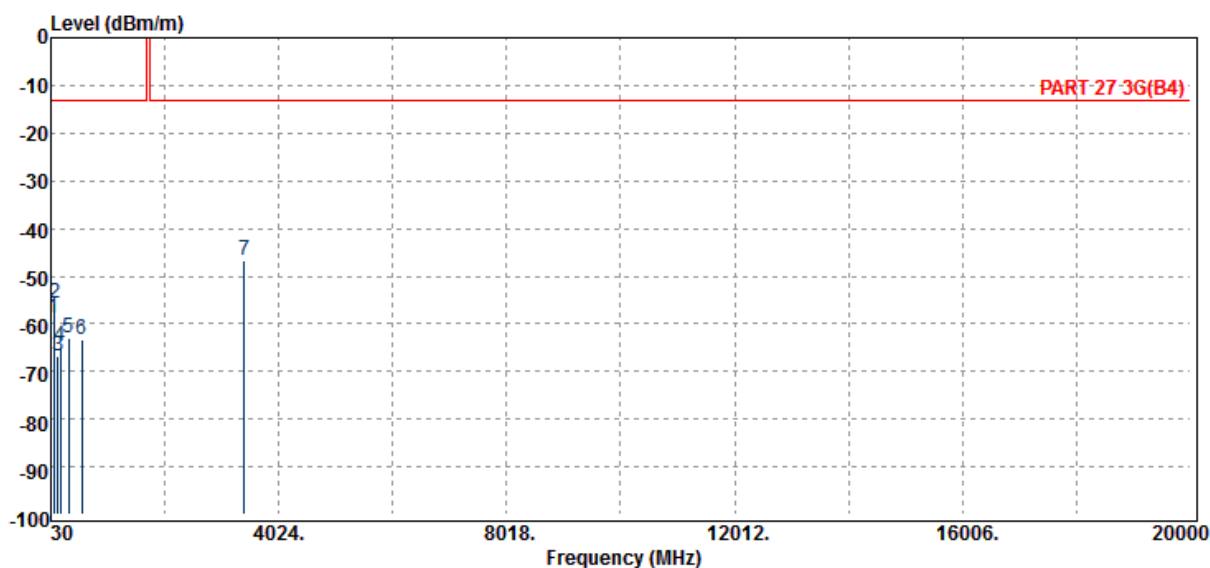
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Radiated Spurious Emission Measurement Result: HSDPA Band 4 Mode (The Worst Case)

Operation Band :HSDPA B4 Temp./Humi. :22 deg_C / 62 RH
 Fundamental Frequency :1712.4 MHz Engineer :Kane
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Pol. Antenna :VERTICAL



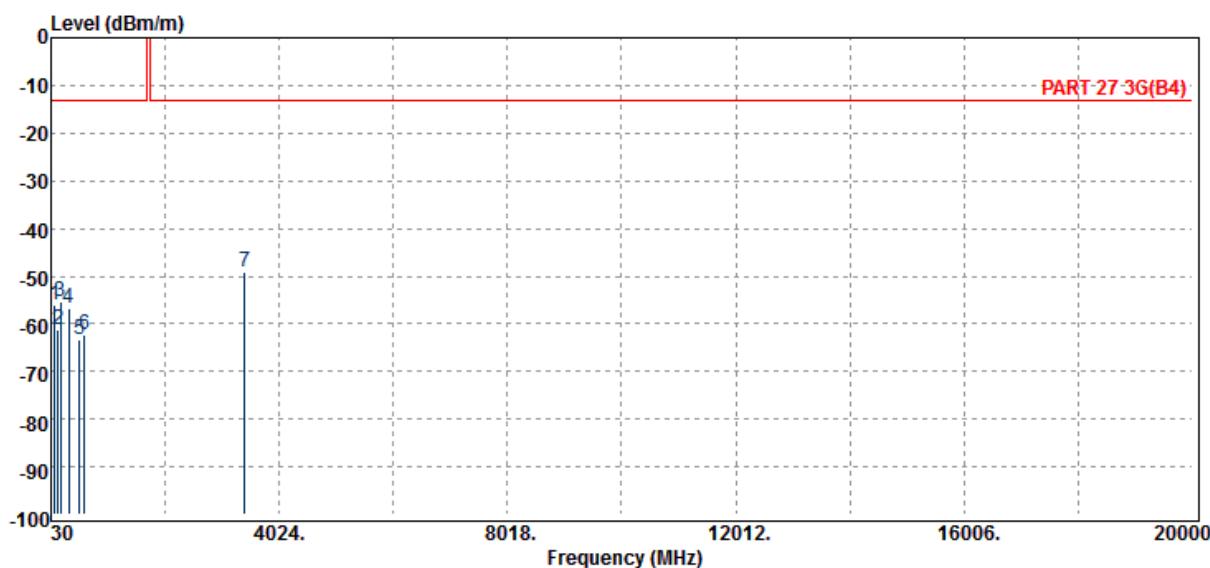
Freq. MHz	Note	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit	Margin
						dBm	dB
74.62	S	-58.82	-53.24	-4.45	-1.13	-13.00	-45.82
95.96	S	-55.60	-53.21	-1.16	-1.23	-13.00	-42.60
159.98	S	-66.87	-63.76	-1.64	-1.48	-13.00	-53.87
202.66	S	-64.63	-66.20	3.22	-1.65	-13.00	-51.63
342.34	S	-62.81	-64.65	3.83	-1.99	-13.00	-49.81
570.29	S	-63.46	-64.13	3.44	-2.77	-13.00	-50.46
3424.80	H	-46.79	-52.83	12.27	-6.23	-13.00	-33.79

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Operation Band :HSDPA B4
 Fundamental Frequency :1712.4 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



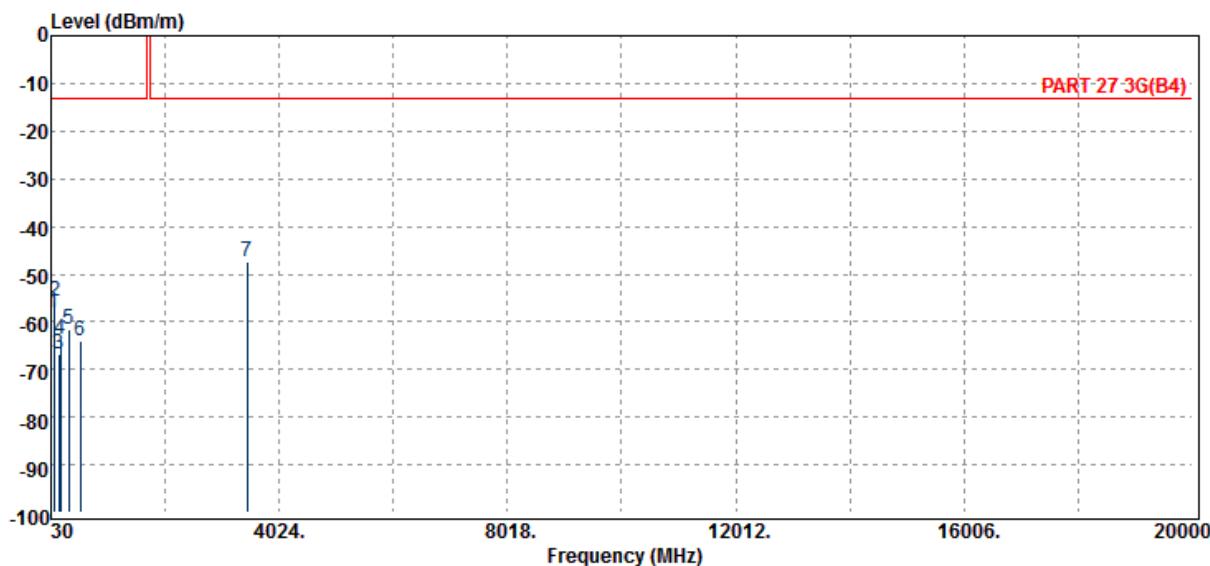
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
94.99	S	-55.90	-53.63	-1.04	-1.23	-13.00	-42.90
159.98	S	-61.41	-58.30	-1.64	-1.48	-13.00	-48.41
202.66	S	-55.20	-56.77	3.22	-1.65	-13.00	-42.20
343.31	S	-56.59	-58.42	3.83	-1.99	-13.00	-43.59
526.64	S	-63.47	-64.72	3.71	-2.46	-13.00	-50.47
610.06	S	-62.43	-63.01	3.22	-2.64	-13.00	-49.43
3424.80	H	-49.01	-55.05	12.27	-6.23	-13.00	-36.01

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Operation Band :HSDPA B4
 Fundamental Frequency :1732.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. Engineer :22 deg_C / 62 RH
 Measurement Pol. Antenna :VERTICAL



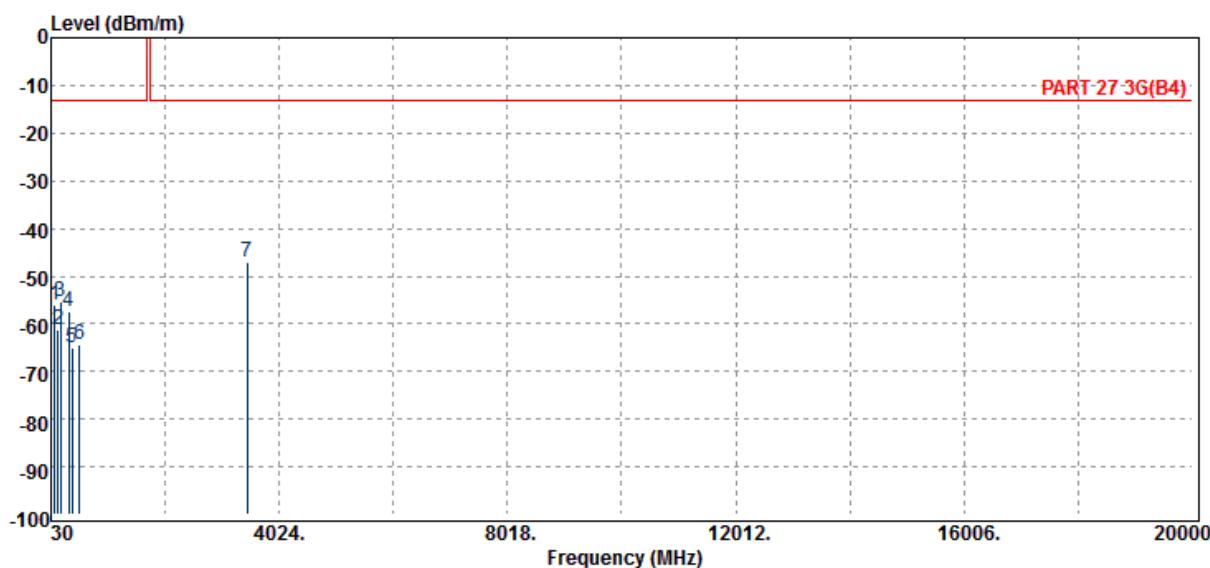
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
78.50	S	-58.10	-53.65	-3.29	-1.15	-13.00	-45.10	
94.99	S	-55.55	-53.28	-1.04	-1.23	-13.00	-42.55	
165.80	S	-66.76	-64.04	-1.21	-1.50	-13.00	-53.76	
202.66	S	-63.57	-65.14	3.22	-1.65	-13.00	-50.57	
335.55	S	-61.69	-63.55	3.80	-1.93	-13.00	-48.69	
539.25	S	-64.06	-65.11	3.64	-2.59	-13.00	-51.06	
3465.20	H	-47.53	-53.63	12.34	-6.25	-13.00	-34.53	

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Operation Band :HSDPA B4
 Fundamental Frequency :1732.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



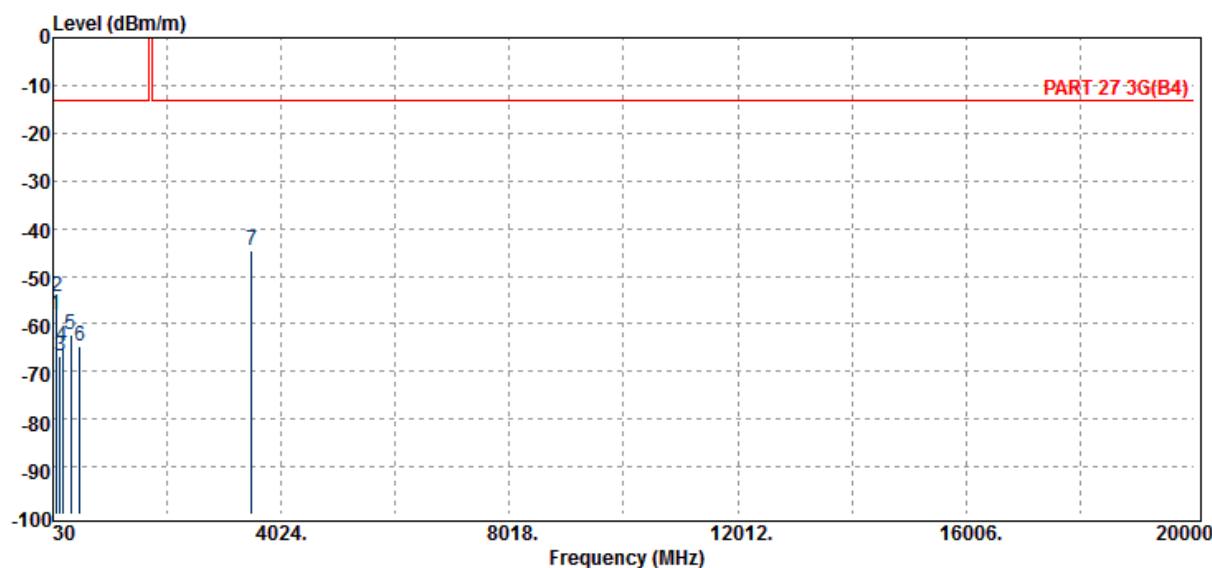
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
95.96	S	-56.15	-53.76	-53.76	-1.16	-1.23	-13.00	-43.15
159.98	S	-61.25	-58.14	-58.14	-1.64	-1.48	-13.00	-48.25
202.66	S	-55.44	-57.01	-57.01	3.22	-1.65	-13.00	-42.44
336.52	S	-57.61	-59.47	-59.47	3.80	-1.94	-13.00	-44.61
401.51	S	-65.22	-66.65	-66.65	3.82	-2.39	-13.00	-52.22
522.76	S	-64.39	-65.70	-65.70	3.73	-2.42	-13.00	-51.39
3465.20	H	-47.16	-53.25	-53.25	12.34	-6.25	-13.00	-34.16

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Operation Band :HSDPA B4
 Fundamental Frequency :1752.6 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



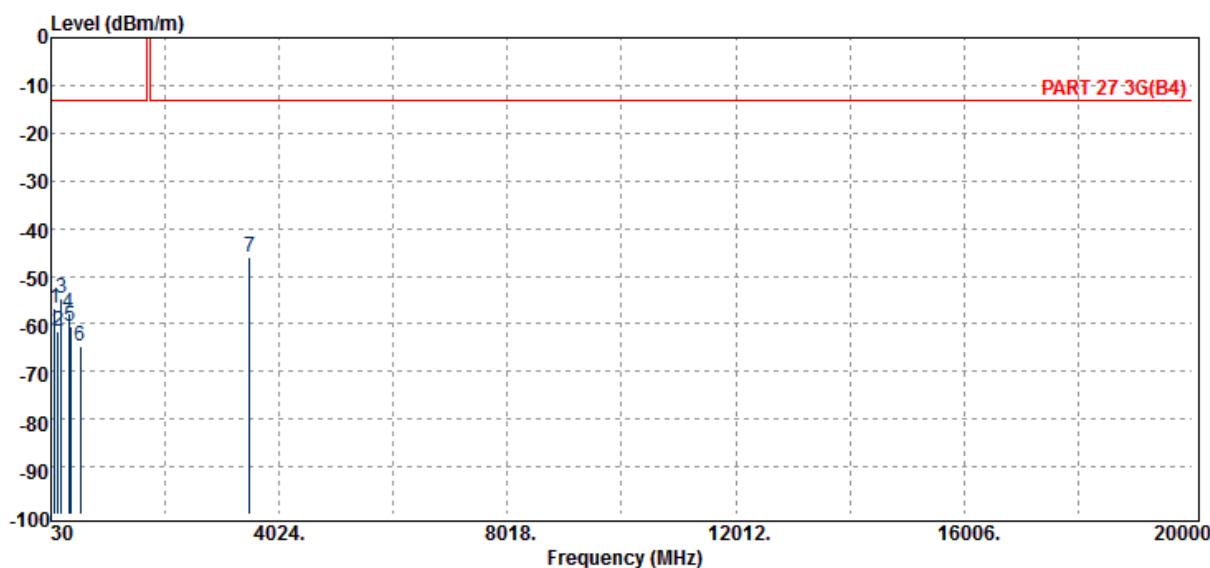
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
76.56	S	-58.08	-53.07	-3.87	-1.14	-13.00	-45.08
94.99	S	-54.49	-52.21	-1.04	-1.23	-13.00	-41.49
159.98	S	-66.66	-63.55	-1.64	-1.48	-13.00	-53.66
202.66	S	-64.80	-66.37	3.22	-1.65	-13.00	-51.80
335.55	S	-62.23	-64.09	3.80	-1.93	-13.00	-49.23
502.39	S	-64.60	-66.13	3.85	-2.32	-13.00	-51.60
3505.20	H	-44.60	-50.54	12.40	-6.47	-13.00	-31.60

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Operation Band :HSDPA B4
 Fundamental Frequency :1752.6 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane
 Temp./Humi. :22 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



Freq. MHz	Note	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit	Margin
						dBm	dB
95.96	S	-56.62	-54.24	-1.16	-1.23	-13.00	-43.62
159.01	S	-61.71	-58.56	-1.68	-1.47	-13.00	-48.71
204.60	S	-54.68	-56.33	3.30	-1.65	-13.00	-41.68
338.46	S	-57.67	-59.53	3.81	-1.95	-13.00	-44.67
366.59	S	-60.50	-62.17	3.85	-2.17	-13.00	-47.50
539.25	S	-64.57	-65.62	3.64	-2.59	-13.00	-51.57
3505.20	H	-45.88	-51.81	12.40	-6.47	-13.00	-32.88

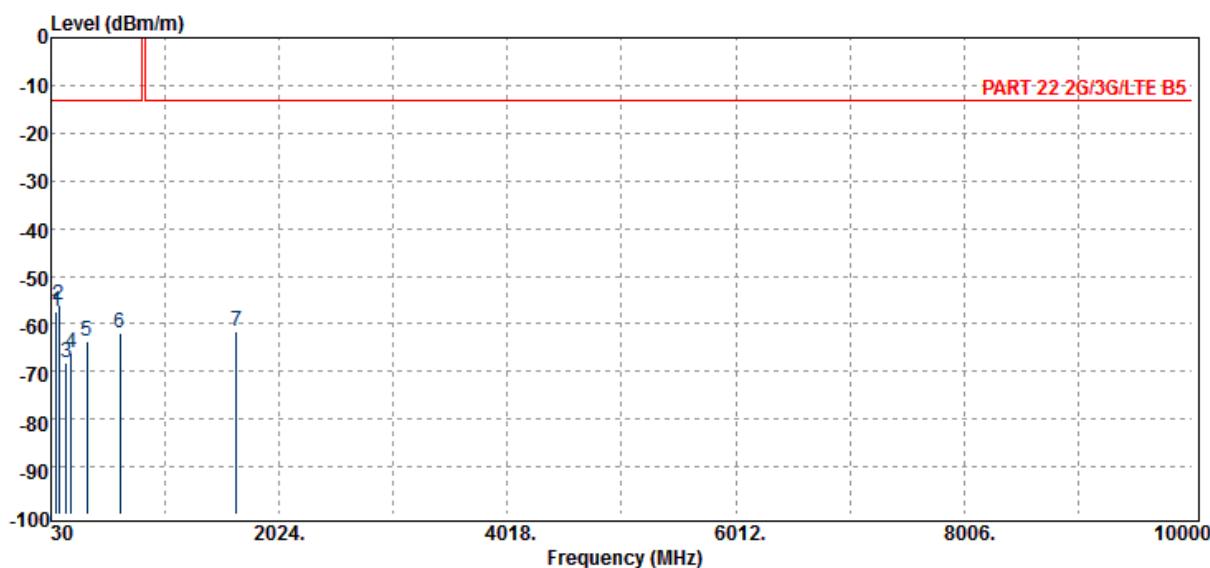
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Radiated Spurious Emission Measurement Result: HSUPA Band 5 Mode (The Worst Case)

Operation Band :HSUPA B5 Temp./Humi. :24 deg_C / 61 RH
 Fundamental Frequency :826.4 MHz Engineer :Kane
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Pol. Antenna :VERTICAL



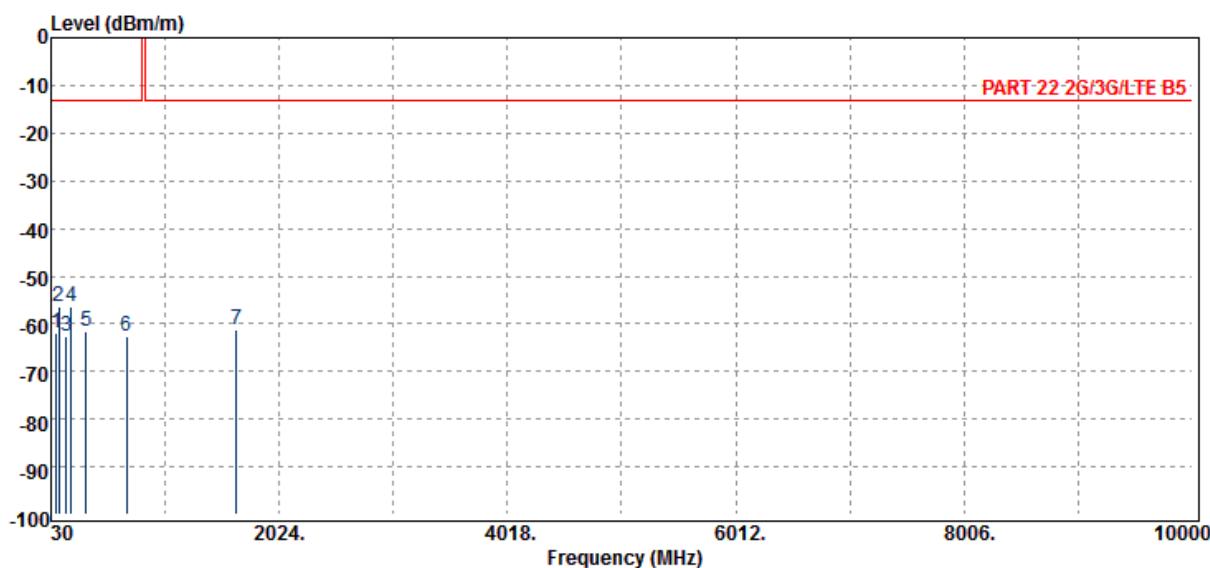
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-57.38	-52.09	-4.16	-1.14	-13.00	-44.38
95.96	S	-56.06	-53.67	-1.16	-1.23	-13.00	-43.06
159.98	S	-68.33	-65.22	-1.64	-1.48	-13.00	-55.33
204.60	S	-66.10	-67.75	3.30	-1.65	-13.00	-53.10
343.31	S	-63.73	-65.56	3.83	-1.99	-13.00	-50.73
634.31	S	-62.01	-62.73	3.17	-2.45	-13.00	-49.01
1652.80	H	-61.48	-66.52	9.27	-4.24	-13.00	-48.48

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Operation Band :HSUPA B5
 Fundamental Frequency :826.4 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



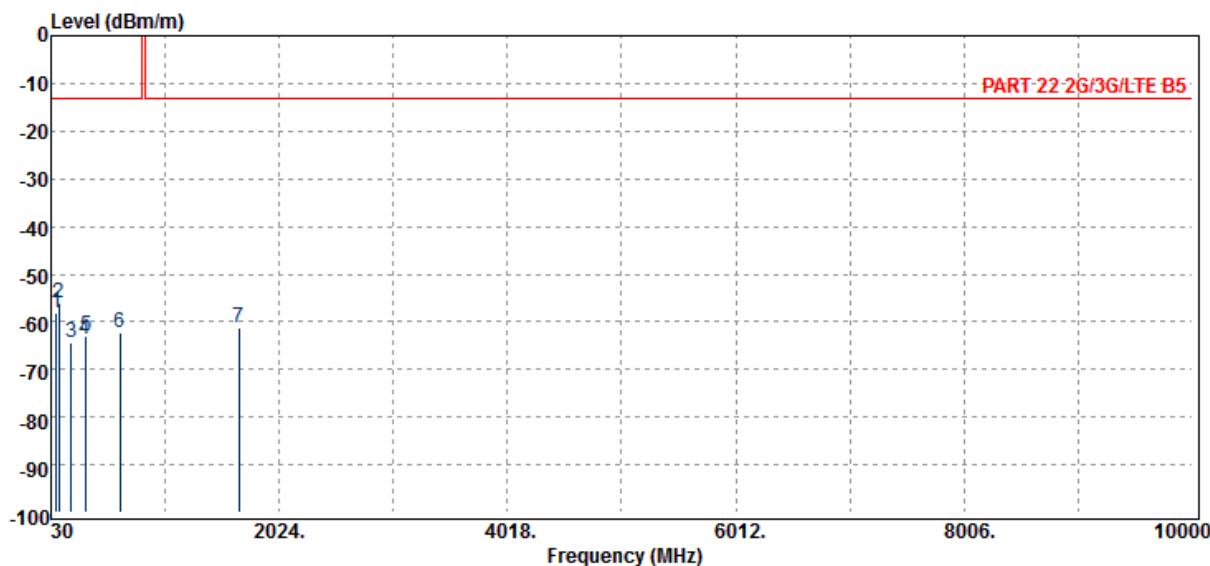
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
75.59	S	-62.11	-56.81	-4.16	-1.14	-13.00	-49.11	
95.96	S	-56.44	-54.05	-1.16	-1.23	-13.00	-43.44	
159.98	S	-62.69	-59.57	-1.64	-1.48	-13.00	-49.69	
204.60	S	-56.24	-57.88	3.30	-1.65	-13.00	-43.24	
336.52	S	-61.53	-63.40	3.80	-1.94	-13.00	-48.53	
692.51	S	-62.66	-62.90	3.09	-2.84	-13.00	-49.66	
1652.80	H	-61.18	-66.21	9.27	-4.24	-13.00	-48.18	

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Operation Band :HSUPA B5
 Fundamental Frequency :836.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :VERTICAL



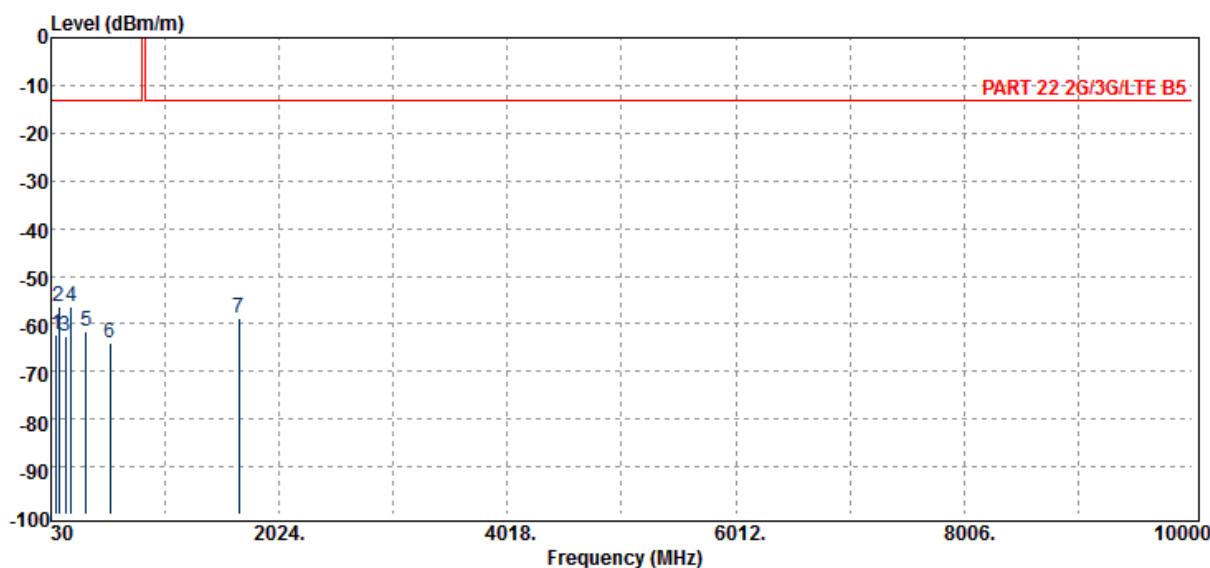
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
75.59	S	-58.00	-52.71	-52.71	-4.16	-1.14	-13.00	-45.00
94.99	S	-56.21	-53.94	-53.94	-1.04	-1.23	-13.00	-43.21
204.60	S	-64.44	-66.09	-66.09	3.30	-1.65	-13.00	-51.44
330.70	S	-63.74	-65.60	-65.60	3.77	-1.91	-13.00	-50.74
338.46	S	-62.99	-64.84	-64.84	3.81	-1.95	-13.00	-49.99
629.46	S	-62.32	-63.04	-63.04	3.18	-2.47	-13.00	-49.32
1673.20	H	-61.08	-66.14	-66.14	9.35	-4.29	-13.00	-48.08

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Operation Band :HSUPA B5
 Fundamental Frequency :836.6 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane
 Temp./Humi. :24 deg_C / 61 RH
 Engineer :Kane
 Measurement Pol. :Antenna :HORIZONTAL



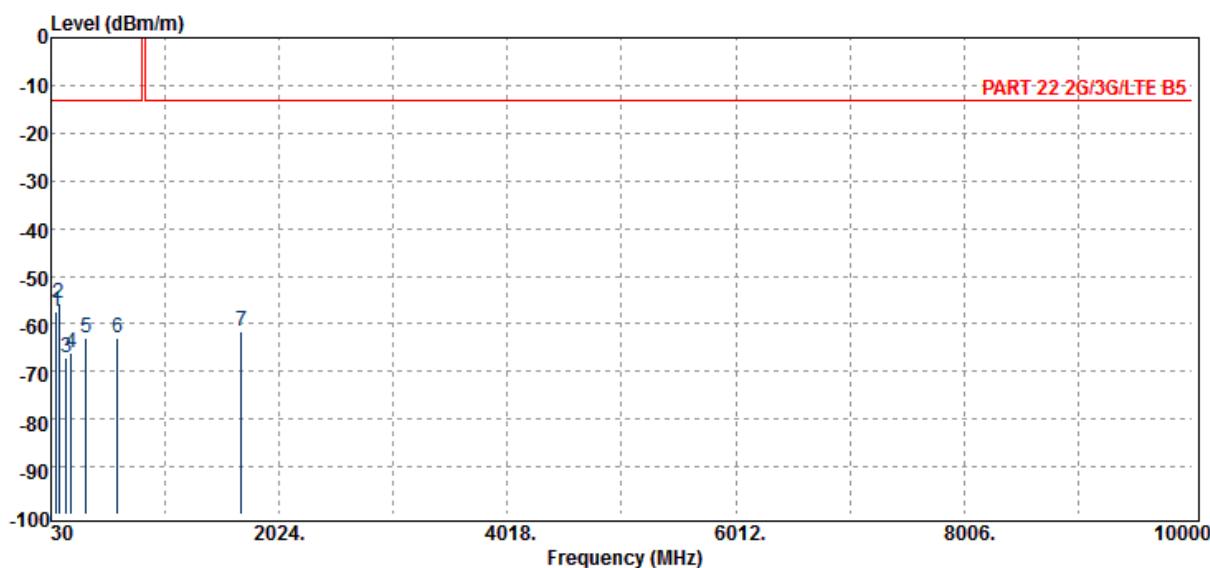
Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG Output Level dBm		Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm	SG Output Level dBm				
75.59	S	-62.41	-57.12	-4.16	-1.14	-13.00	-49.41	
95.96	S	-56.52	-54.13	-1.16	-1.23	-13.00	-43.52	
159.01	S	-62.60	-59.45	-1.68	-1.47	-13.00	-49.60	
204.60	S	-56.23	-57.88	3.30	-1.65	-13.00	-43.23	
335.55	S	-61.51	-63.38	3.80	-1.93	-13.00	-48.51	
548.95	S	-63.91	-64.81	3.59	-2.69	-13.00	-50.91	
1673.20	H	-58.92	-63.98	9.35	-4.29	-13.00	-45.92	

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Operation Band : HSUPA B5
 Fundamental Frequency : 846.6 MHz
 Operation Mode : Tx CH HIGH
 EUT Pol. : E2 Plane
 Temp./Humi. : 24 deg_C / 61 RH
 Engineer : Kane
 Measurement Pol. : VERTICAL



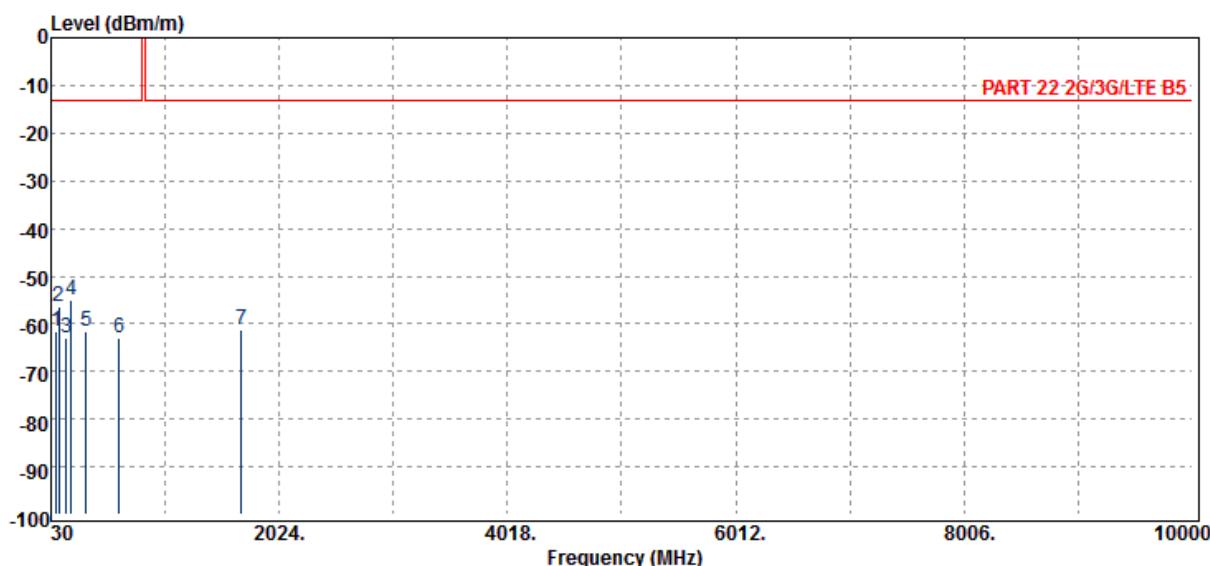
Freq. MHz	Note	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-57.28	-51.98	-4.16	-1.14	-13.00	-44.28
95.96	S	-55.86	-53.47	-1.16	-1.23	-13.00	-42.86
159.98	S	-67.20	-64.09	-1.64	-1.48	-13.00	-54.20
204.60	S	-66.20	-67.84	3.30	-1.65	-13.00	-53.20
335.55	S	-63.02	-64.89	3.80	-1.93	-13.00	-50.02
610.06	S	-63.04	-63.63	3.22	-2.64	-13.00	-50.04
1693.20	H	-61.68	-66.79	9.42	-4.30	-13.00	-48.68

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Operation Band : HSUPA B5
 Fundamental Frequency : 846.6 MHz
 Operation Mode : Tx CH HIGH
 EUT Pol. : E2 Plane
 Temp./Humi. : 24 deg_C / 61 RH
 Engineer : Kane
 Measurement Pol. : Antenna : HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP/EIRP dBm	SG	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
			Output Level dBm				
75.59	S	-61.61	-56.32	-4.16	-1.14	-13.00	-48.61
95.96	S	-56.39	-54.00	-1.16	-1.23	-13.00	-43.39
159.98	S	-63.07	-59.96	-1.64	-1.48	-13.00	-50.07
204.60	S	-55.11	-56.75	3.30	-1.65	-13.00	-42.11
335.55	S	-61.57	-63.43	3.80	-1.93	-13.00	-48.57
621.70	S	-63.12	-63.78	3.20	-2.53	-13.00	-50.12
1693.20	H	-61.38	-66.49	9.42	-4.30	-13.00	-48.38

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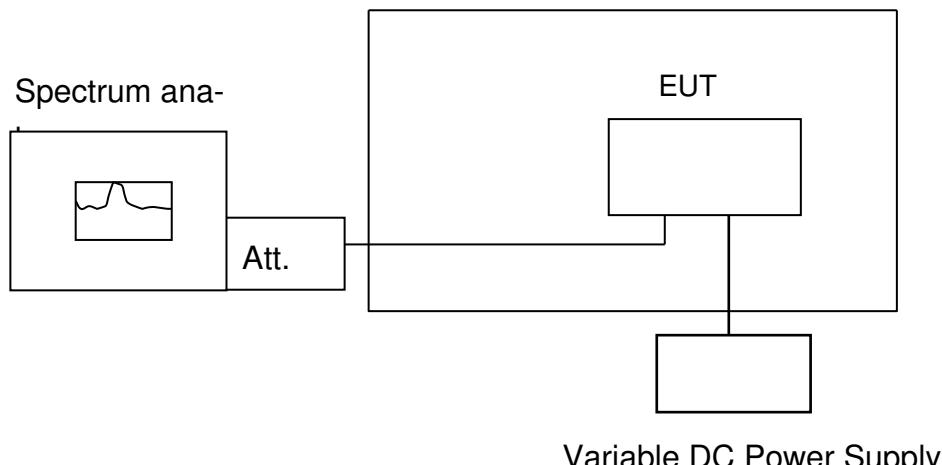
11. FREQUENCY STABILITY MEASUREMENT

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:

Temperature Chamber



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 (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HU-BER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	10/27/2016	10/26/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyzer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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11.5. Measurement Result:

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°C)	(Hz)		
FREQUENCY ERROR vs. VOLTAGE				
12	20	836600027	27	2091
11.5	20	836600035	35	2091
11	20	836600025	25	2091
10.5 (End point)	20	836600039	39	2091
FREQUENCY ERROR vs. Temp.				
12	50	836600016	16	2091
12	40	836600020	20	2091
12	30	836600029	29	2091
12	20	836600028	28	2091
12	10	836600034	34	2091
12	0	836600021	21	2091
12	-10	836600036	36	2091
12	-20	836600043	43	2091
12	-30	836600031	31	2091

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Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
FREQUENCY ERROR vs. VOLTAGE				
12	20	1879999976	-24	4700
11.5	20	1879999972	-28	4700
11	20	1879999978	-22	4700
10.5 (End point)	20	1879999994	-6	4700
FREQUENCY ERROR vs. Temp.				
12	50	1879999925	-75	4700
12	40	1879999976	-24	4700
12	30	1879999961	-39	4700
12	20	1879999982	-18	4700
12	10	1879999973	-27	4700
12	0	1879999982	-18	4700
12	-10	1879999981	-19	4700
12	-20	1879999967	-33	4700
12	-30	1879999972	-18	4700

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Reference Frequency: WCDMA II Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
FREQUENCY ERROR vs. VOLTAGE				
12	20	1880000023	23	4700
11.5	20	1880000012	12	4700
11	20	1880000025	25	4700
10.5 (End point)	20	1880000039	39	4700
FREQUENCY ERROR vs. Temp.				
Reference Frequency: WCDMA II Mid Channel 1880				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
12	50	1880000034	34	4700
12	40	1880000041	41	4700
12	30	1880000051	51	4700
12	20	1880000043	43	4700
12	10	1880000034	34	4700
12	0	1880000025	25	4700
12	-10	1880000036	36	4700
12	-20	1880000058	58	4700
12	-30	1880000015	15	4700

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Reference Frequency: WCDMA IV Mid Channel 1732.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
FREQUENCY ERROR vs. VOLTAGE				
12	20	173259982	-18	4331
11.5	20	173259997	-3	4331
11	20	173259980	-20	4331
10.5 (End point)	20	173259983	-17	4331
FREQUENCY ERROR vs. Temp.				
Reference Frequency: WCDMA IV Mid Channel 1732.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
12	50	173259985	-15	4331
12	40	173259972	-28	4331
12	30	173259963	-37	4331
12	20	173259971	-29	4331
12	10	173259981	-19	4331
12	0	173259996	-4	4331
12	-10	173259990	-10	4331
12	-20	173259973	-27	4331
12	-30	173259986	-14	4331

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Reference Frequency: WCDMA V Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
FREQUENCY ERROR vs. VOLTAGE				
12	20	836600021	21	2091
11.5	20	836600008	8	2091
11	20	836600015	15	2091
10.5 (End point)	20	836600021	21	2091
FREQUENCY ERROR vs. Temp.				
Reference Frequency: WCDMA V Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temp. (°)	(Hz)		
12	50	836600016	16	2091
12	40	836600028	28	2091
12	30	836600031	31	2091
12	20	836600027	27	2091
12	10	836600031	31	2091
12	0	836600025	25	2091
12	-10	836600031	31	2091
12	-20	836600025	25	2091
12	-30	836600031	31	2091

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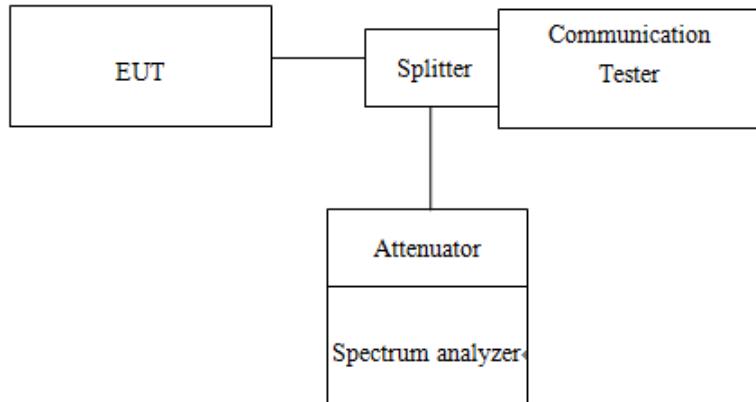
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12. PEAK TO AVERAGE RATIO

12.1. Standard Applicable

The peak-to-average ratio (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.

12.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	10/27/2016	10/26/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/19/2017	05/18/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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12.5. Measurement Result

Tabular Results:

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		GSM 850	GPRS 850	EDGE 850
824.2	128	-	10.26	13.3
836.6	190	-	9.61	11.5
848.8	251	-	8.51	11.83

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		GSM 1900	GPRS 1900	EDGE 1900
1850.2	512	-	10.26	12.86
1880	661	-	9.22	11.99
1909.8	810	-	9.45	12.92

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA II	HSDPA II	HSUPA II
1852.4	9262	3.01	3.69	3.60
1880	9400	2.80	3.92	3.64
1907.6	9538	3.04	3.72	3.66

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA IV	HSDPA IV	HSUPA IV
1712.4	1312	2.84	3.58	3.92
1732.6	1413	2.82	3.72	3.71
1752.6	1513	2.81	3.77	3.57

Freq. (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA V	HSDPA V	HSUPA V
826.4	4132	2.76	3.97	4.12
836.6	4183	2.77	4.08	4.07
846.6	4233	2.86	4.01	3.87

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GPRS_850MHz_LowCH128-824.2



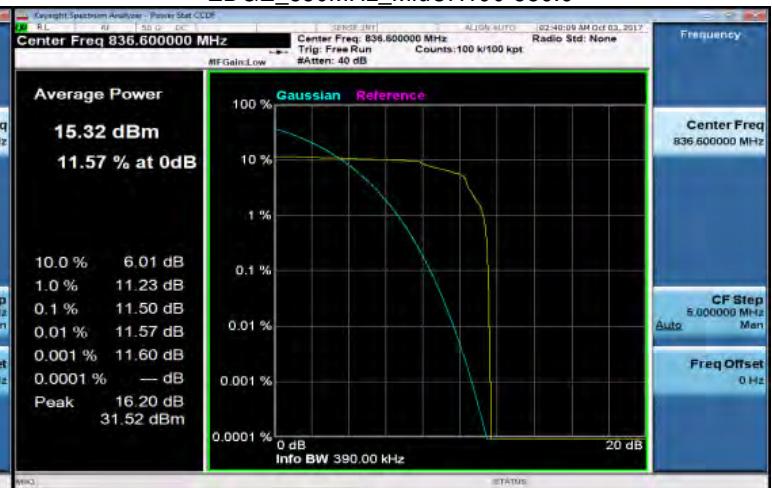
EDGE_850MHz_LowCH128-824.2



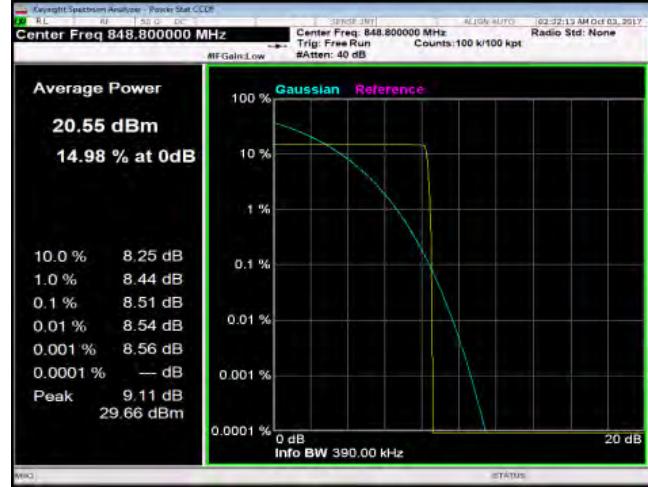
GPRS_850MHz_MidCH190-836.6



EDGE_850MHz_MidCH190-836.6



GPRS_850MHz_HighCH251-848.8



EDGE_850MHz_HighCH251-848.8



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GPRS_1900MHz_LowCH512-1850.2



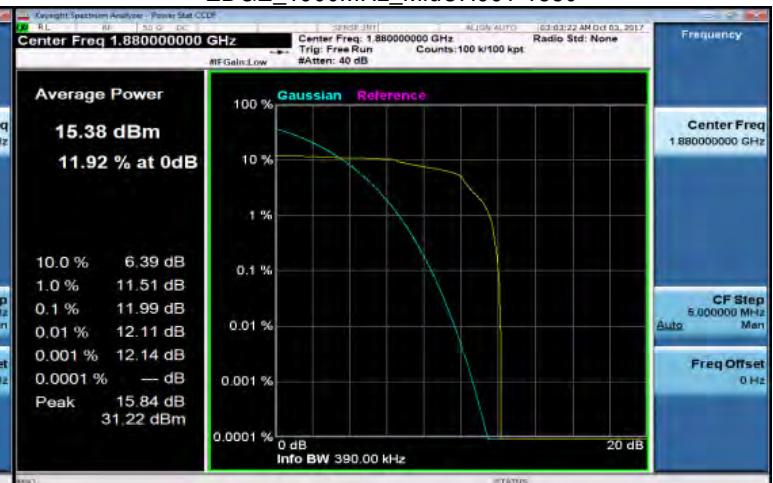
EDGE_1900MHz_LowCH512-1850.2



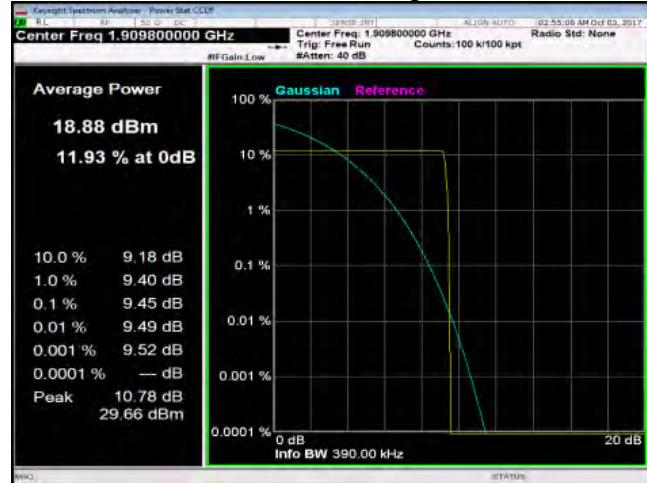
GPRS_1900MHz_MidCH661-1880



EDGE_1900MHz_MidCH661-1880



GPRS_1900MHz_HighCH810-1909.8



EDGE_1900MHz_HighCH810-1909.8



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WCDMA_B2_LowCH9262-1852.4



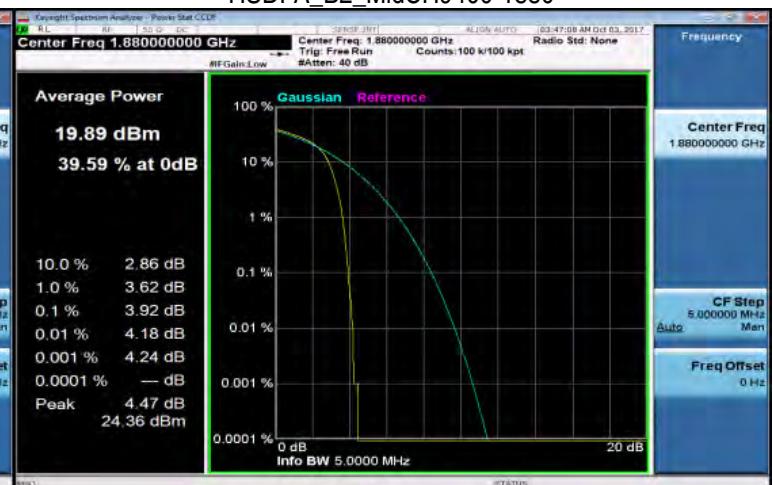
HSDPA_B2_LowCH9262-1852.4



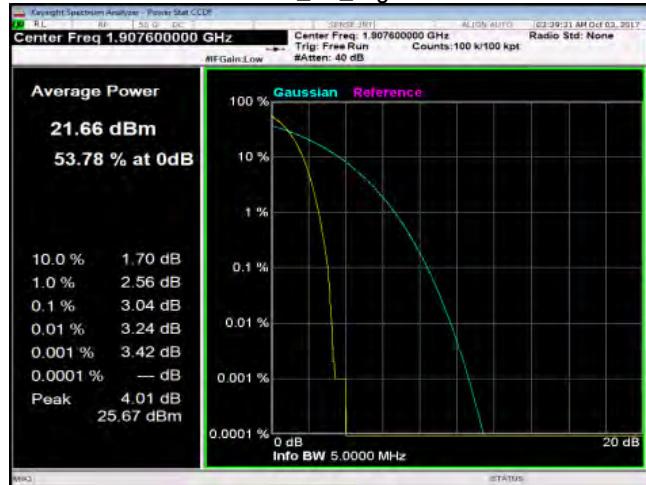
WCDMA_B2_MidCH9400-1880



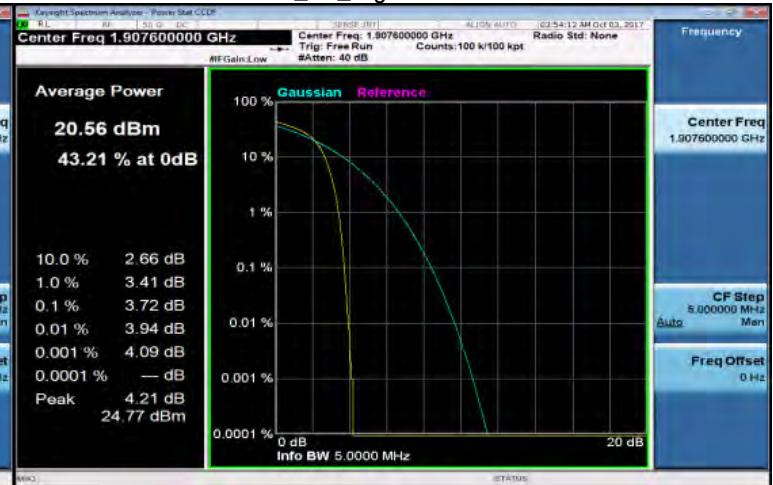
HSDPA_B2_MidCH9400-1880



WCDMA_B2_HighCH9538-1907.6



HSDPA_B2_HighCH9538-1907.6



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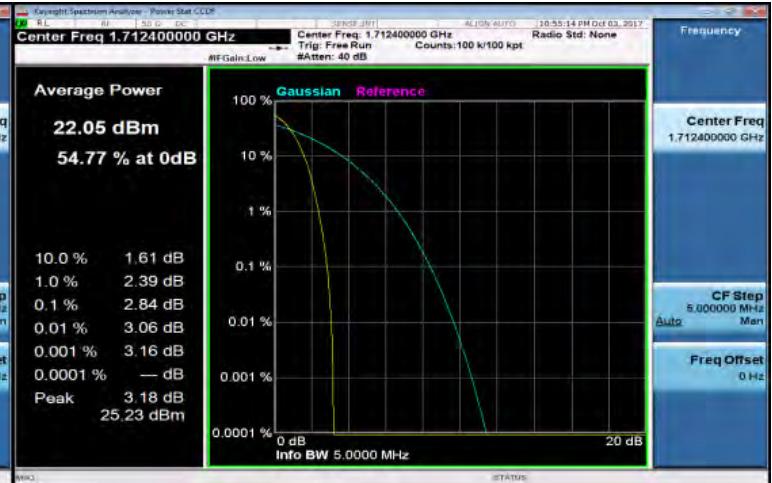
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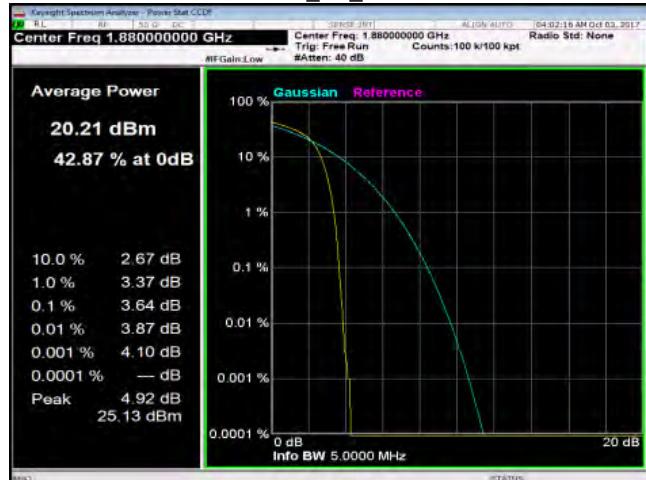
HSUPA_B2_LowCH9262-1852.4



WCDMA_B4_LowCH1312-1712.4



HSUPA_B2_MidCH9400-1880



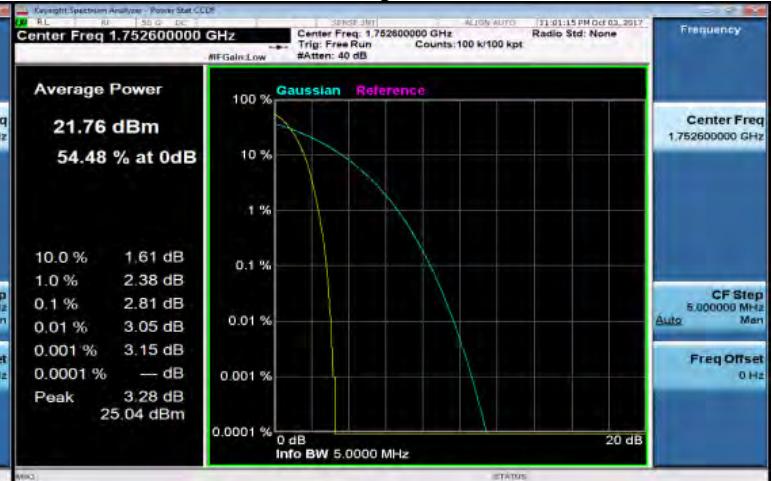
WCDMA_B4_MidCH1413-1732.6



HSUPA_B2_HighCH9538-1907.6



WCDMA_B4_HighCH1513-1752.6



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HSDPA_B4_LowCH1312-1712.4



HSUPA_B4_LowCH1312-1712.4



HSDPA_B4_MidCH1413-1732.6



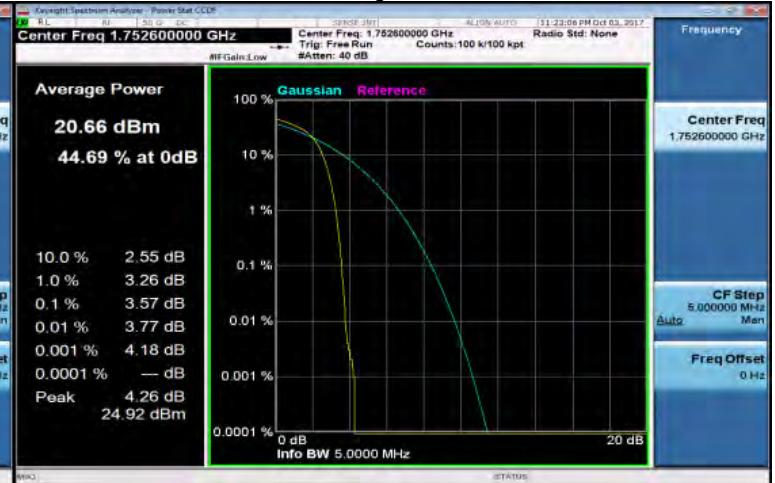
HSUPA_B4_MidCH1413-1732.6



HSDPA_B4_HighCH1513-1752.6



HSUPA_B4_HighCH1513-1752.6



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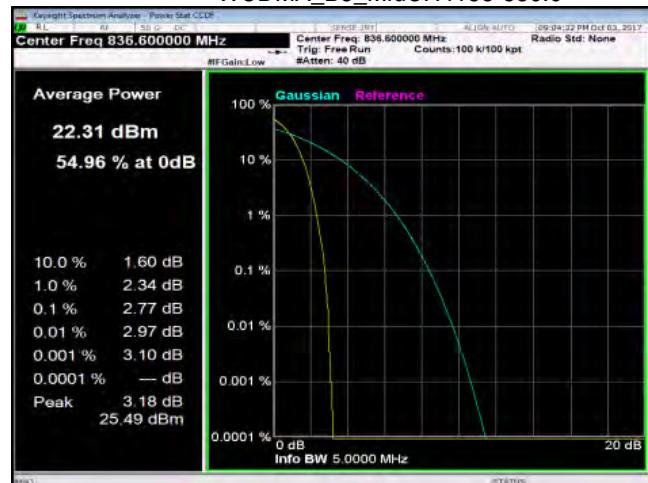
WCDMA_B5_LowCH4132-826.4



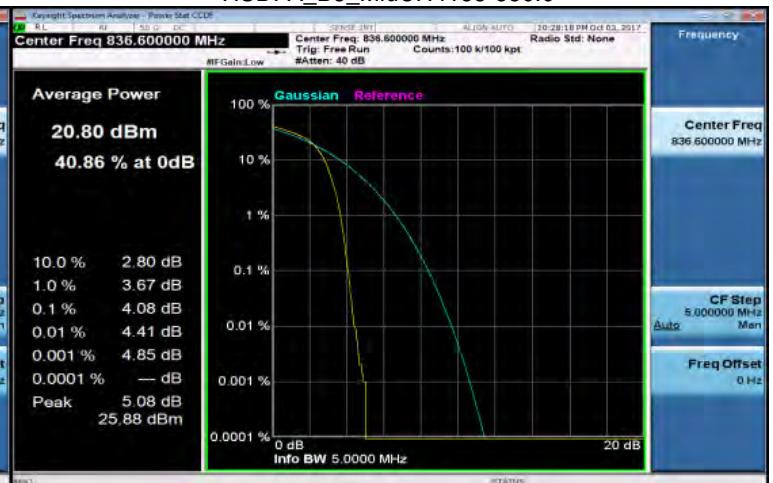
HSDPA_B5_LowCH4132-826.4



WCDMA_B5_MidCH4183-836.6



HSDPA_B5_MidCH4183-836.6



WCDMA_B5_HighCH4233-846.6



HSDPA_B5_HighCH4233-846.6



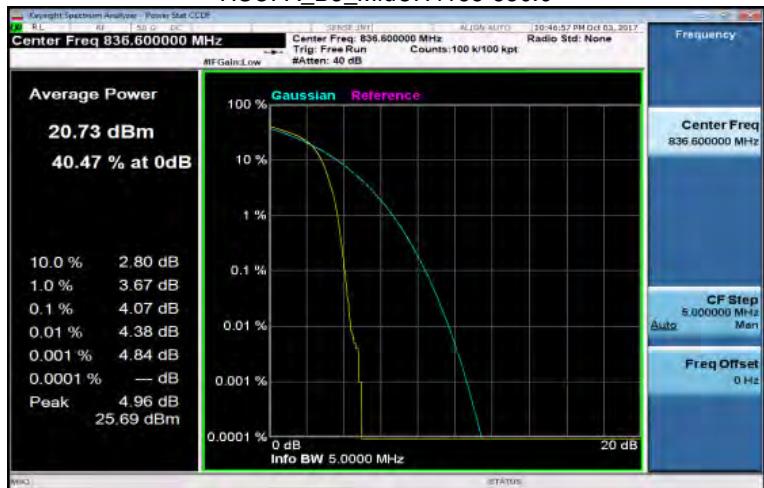
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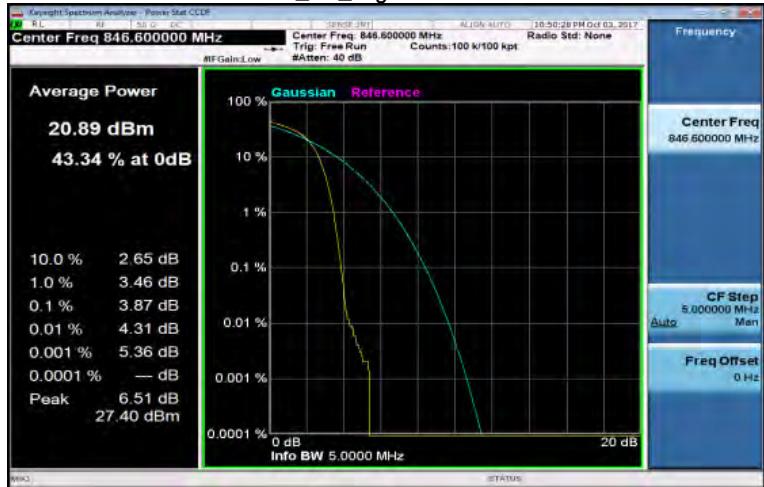
HSUPA_B5_LowCH4132-826.4



HSUPA_B5_MidCH4183-836.6



HSUPA_B5_HighCH4233-846.6



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~ *End of Report* ~

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