



TEST REPORT

Report Number. : R1358896-E4

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU
SUWON-SI, GYEONGGI-DO, 16677, KOREA

Model : SM-M127F, SM-M127F/DS

FCC ID : A3LSMM127F

EUT Description : GSM/WCDMA/LTE PHABLET WITH BT/BLE AND DTS B/G/N

Test Standard(s) : FCC CFR47 PART 22H, 24E AND 27

Date Of Issue:
2020-12-08

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400



NVLAP Lab code: 200246-0

Revision History



<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2020-11-30	Initial Review	Mike Antola
V2	2020-12-08	Removed receive mode appendix	Mike Antola

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU SUWON-SI, GYEONGGI-DO, 16677, KOREA	
Model	SM-M127F, SM-M127F/DS	
FCC ID	A3LSMM127F	
IC	NA	
EUT Description	GSM/WCDMA/LTE PHABLET WITH BT/BLE AND DTS B/G/N	
Serial Number	RADIATED: TJG2458M, TJG2699M; CONDUCTED: TJF2546	
Sample Receipt Date	2020-10-23	
Date Tested	OCTOBER 27, 2020 to NOVEMBER 24, 2020	
Applicable Standards	FCC CFR47 PART 22H, 24E AND 27	
Test Results	COMPLIES	
<p>UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.</p>		
Reviewed By:	Prepared By:	
		
Dan Corona Operations Leader UL VERIFICATION SERVICES INC	Mike Antola Staff Engineer UL LLC	

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 15, Part 22, Part 24, Part 27
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r01](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

12 Laboratory Dr.	2800 Perimeter Park Dr.
<input type="checkbox"/> Chamber A RTP	<input checked="" type="checkbox"/> North Chamber
<input type="checkbox"/> Chamber C RTP	<input checked="" type="checkbox"/> South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration #: 703469.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9 kHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Occupied Channel Bandwidth	±1.22 %
Temperature	±0.57 %
Supply voltages	±0.57 %
Time	±0.02 %

Uncertainty figures are valid to a confidence level of 95%.

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
 Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
 Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
 36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phablet with BT/BLE and DTS b/g/n. The model SM-M127F/DS was used for final testing and is representative of the test results in this report.

The models are electronically equivalent with the only difference being that the SM-M127F/DS has dual SIM capability.

5.2. MAXIMUM OUTPUT POWER

EIRP/ERP LIMIT

FCC: §2.1046, §22.913, §24.232, §27.50

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015, Subclause 5.2.7 / TIA-603E Clause 2.2.17
KDB 971168 D01 Section 5.8
KDB 412172 D01

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

GSM MODES

Part 22 850MHz					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
824.2-848.8	GPRS	19.54	0.0899	241.69	242KGXW
	EGPRS	13.38	0.0218	245.45	245KG7W
Part 24 1900MHz					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1850.2-1909.8	GPRS	26.31	0.4276	241.48	241KGXW
	EGPRS	24.83	0.3041	241.82	242KG7W

WCDMA MODES

Part 22 Band 5					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
826.4-846.6	REL 99	11.75	0.0150	4.1371	4K14F9W
	HSDPA	12.36	0.0172	4.1381	4K14F9W
Part 24 Band 2					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1852.4-1907.6	REL 99	16.37	0.0434	4.1303	4K13F9W
	HSDPA	15.59	0.0362	4.1349	4K13F9W
Part 27 Band 4					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1712.4-1752.6	REL 99	17.14	0.0518	4.1259	4K13F9W
	HSDPA	14.99	0.0316	4.1458	4K15F9W

5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was HW: REV 0.1

5.4. MAXIMUM ANTENNA GAIN

Bands / Frequency Range	Antenna Gain (dBi)
GSM850, 824-849MHz	-2.3
GSM1900, 1850-1910MHz	2.0
WCDMA Band 2, 1850-1910 MHz	2.0
WCDMA Band 4, 1710-1755 MHz	0.4
WCDMA Band 5, 824-849 MHz	-2.3

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X/Y/Z both below and above 1GHz. For below 1GHz, it was determined that X-axis orientation was the worst-case orientation. For above 1GHz, it was determined that Y-axis orientation was the worst-case orientation. The EUT was tested with the AC/DC adapter and headphones connected as this represented worse case.

Based on average conducted output power measurement investigations. The worst-case is Ant1 with the highest power. Therefore, Ant 1 was used to perform all conducted tests.

The worst-case scenario for all measurements as followed:

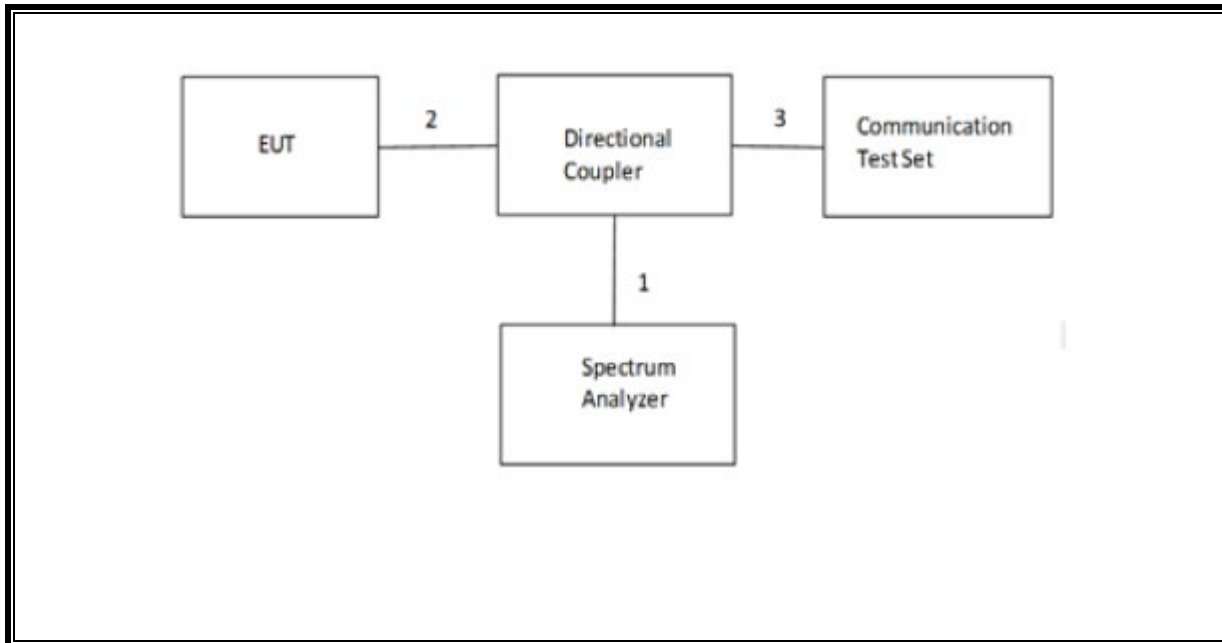
- GSM GPRS
- GSM EGPRS
- WCDMA REL 99
- WCDMA HSDPA

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions detected above the system noise floor below 30MHz and above 18GHz.

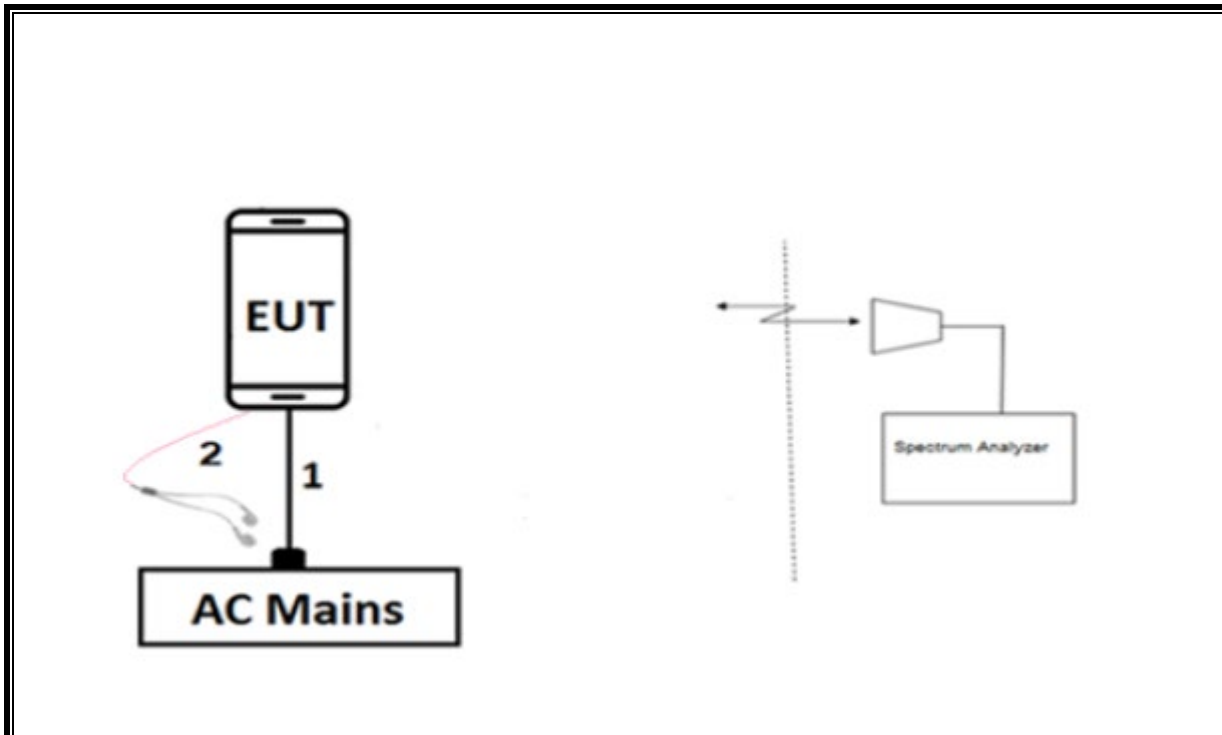
5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Earphone	NA	NA	NA	NA		
AC/DC adapter	Samsung	EP-TA200	R3M3FV0M01DK3	NA		
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	N/A
2	Antenna Port	1	EUT	Shielded	0.1m	N/A
3	RF In/Out	1	Communication Test Set	Shielded	1m	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	AC Adapter	Shielded	1	N/A
2	Earphone	1	Phono	Un-shielded	1	N/A

CONDUCTED SETUP



RADIATED SETUP



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	(Loop Ant.)			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	30-1000 MHz				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2021-07-06
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5 (2020-08-18)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
T918	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2020-04-02	2021-04-02
HPF012	1GHz high-pass filter, 2W, F _{high} =18GHz	Micro-Tronics	HPM18129	2020-02-19	2021-02-19
HPF015	4GHz high-pass filter, 2W, F _{high} =18GHz	Micro-Tronics	HPM13351	2020-08-29	2021-08-29
LPF008	DC-1000MHz low-pass filter	Pasternack	PE8720	2020-07-15	2021-07-15
BRF001	900MHz notch filter, 2W, F _{high} =6GHz	Micro-Tronics	BRM50706	2020-07-15	2021-07-15
AT0062	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz (TX Antenna)	ETS Lindgren	3117	2020-01-30	2021-01-30
EMC 4075	Log Periodic Antenna (TX Antenna)	Chase	UPA6109	2020-10-08	2021-10-08
SIG005	Signal Generator	Agilent	83640B	2020-08-19	2021-08-19

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 2				
SA027	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2020-07-17	2021-07-17
PWS002 (PRE0137348)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2020-09-10	2021-09-10
76023 (EC0225)	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2020-05-27	2021-05-27
HI0090 (PRE0191271)	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
76021	DC Regulated Power Supply	CircuitSpecialists. Com	CSI3005X5	NA	NA
SOFTEMI	EMC Software	UL	Version 9.5 (2020-10-14)		
	Additional Equipment used				
80579 (T374)	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500 (SN 132911)	2020-08-07	2021-08-07

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-07-27	2021-07-27
	18-40 GHz				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
	Gain-Loss Chains				
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-29	2021-07-29
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-07	2021-07-07
	Receiver & Software				
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
SOFTEMI	EMI Software	UL	Version 9.5 (2020-08-18)		
	Additional Equipment used				
s/n 200037610	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
T374	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2020-08-07	2021-08-07
BRF001	900MHz notch filter, 2W, F _{high} =6GHz	Micro-Tronics	BRM50706	2020-07-15	2021-07-15
	Low-Pass Filters				
LPF008	DC-1000MHz low-pass filter	LPF008	DC-1000MHz low-pass filter	LPF008	DC-1000MHz low-pass filter

7. RF OUTPUT POWER VERIFICATION

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows:

7.1. GSM

Using CMW500 Communication Test Set

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus

Press **RESET** > choose all to reset all settings

Connection	Press Signal Off to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting > Slot configuration > Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel Frequency Offset > + 0 Hz Mode > BCCH and TCH BCCH Level > -85 dBm (May need to adjust if link is not stable) BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel] Channel Type > Off P0> 4 dB Slot Config > Unchanged (if already set under MS Signal) TCH > choose desired test channel Hopping > Off Main Timeslot > 3 (Default)
Network	Coding Scheme > CS 4 (GPRS) and MCS5 (EGPRS) Bit Stream > 2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection	Press Signal On to turn on the signal and change settings

RESULT

7.1.1. GSM 850

Test Engineer ID:	44379	Test Date:	10/29/2020
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Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	
					Burst Power	Frame Power
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.7	23.6
			190	836.6	32.9	23.9
			251	848.8	33.0	23.9
		2	128	824.2	30.3	24.3
			190	836.6	30.6	24.5
			251	848.8	30.5	24.5
		3	128	824.2	28.9	24.7
			190	836.6	29.2	24.9
			251	848.8	29.1	24.8
		4	128	824.2	27.8	24.8
			190	836.6	27.7	24.7
			251	848.8	27.8	24.8
EDGE (8PSK)	MCS5	1	128	824.2	27.1	18.1
			190	836.6	27.1	18.0
			251	848.8	27.1	18.1
		2	128	824.2	24.6	18.6
			190	836.6	25.0	19.0
			251	848.8	24.7	18.7
		3	128	824.2	23.9	19.6
			190	836.6	23.7	19.5
			251	848.8	23.9	19.6
		4	128	824.2	22.1	19.1
			190	836.6	22.3	19.2
			251	848.8	22.1	19.1

7.1.2. GSM 1900

Test Engineer ID:	44379	Test Date:	10/29/2020
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Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	
					Burst Power	Frame Power
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	29.3	20.2
			661	1880.0	29.3	20.2
			810	1909.8	29.4	20.3
		2	512	1850.2	26.2	20.2
			661	1880.0	26.1	20.0
			810	1909.8	26.1	20.1
		3	512	1850.2	24.4	20.1
			661	1880.0	24.4	20.2
			810	1909.8	24.2	19.9
		4	512	1850.2	22.6	19.6
			661	1880.0	22.5	19.5
			810	1909.8	22.5	19.5
EDGE (8PSK)	MCS5	1	512	1850.2	25.5	16.5
			661	1880.0	25.6	16.6
			810	1909.8	25.4	16.3
		2	512	1850.2	23.5	17.5
			661	1880.0	23.5	17.5
			810	1909.8	23.6	17.5
		3	512	1850.2	22.0	17.8
			661	1880.0	22.0	17.7
			810	1909.8	21.9	17.6
		4	512	1850.2	20.3	17.3
			661	1880.0	20.5	17.4
			810	1909.8	20.3	17.3

7.2. WCDMA

TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW \geq RBW \geq 26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

REL 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2Kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA REL 5

The following 4 Sub-tests were completed according to Release 5 procedures in table C.10.1.4 of 3GPP TS 34.121-1 A summary of these settings are illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

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)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSPA REL 6 (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings are illustrated below:

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} : 47/15 β_{ed2} : 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DUAL CARRIER HSDPA (DC-HSDPA (REL 8, CAT 24))

The following 4 Sub-tests were for DC-HSDPA were completed according to Release 8 procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of these settings are illustrated below:

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

HSPA+ REL 7

The following 1 Sub-test was completed according to Release 7 procedures in table C.11.1.4 of 3GPP TS34.121. A summary of these settings are illustrated below:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

RESULT

7.2.1. WCDMA BAND 5

Test Engineer ID:	10615	Test Date:	10/27/2020
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Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	MPR (dB)
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.8	N/A
		4183	836.6	23.8	
		4233	846.6	23.9	
HSDPA	Subtest 1	4132	826.4	20.4	0
		4183	836.6	20.5	
		4233	846.6	20.5	
	Subtest 2	4132	826.4	22.4	0
		4183	836.6	22.5	
		4233	846.6	22.5	
	Subtest 3	4132	826.4	21.7	0.5
		4183	836.6	21.9	
		4233	846.6	21.3	
	Subtest 4	4132	826.4	21.7	0.5
		4183	836.6	21.8	
		4233	846.6	21.5	
HSUPA	Subtest 1	4132	826.4	21.4	0
		4183	836.6	21.4	
		4233	846.6	21.6	
	Subtest 2	4132	826.4	20.0	2
		4183	836.6	20.2	
		4233	846.6	20.1	
	Subtest 3	4132	826.4	20.6	1
		4183	836.6	20.5	
		4233	846.6	20.8	
	Subtest 4	4132	826.4	19.5	2
		4183	836.6	19.6	
		4233	846.6	19.8	
	Subtest 5	4132	826.4	21.4	0
		4183	836.6	21.4	
		4233	846.6	21.6	
DC-HSDPA	Subtest 1	4132	826.4	20.5	0
		4183	836.6	20.4	
		4233	846.6	20.4	
	Subtest 2	4132	826.4	22.5	0
		4183	836.6	22.5	
		4233	846.6	22.4	
	Subtest 3	4132	826.4	21.0	0.5
		4183	836.6	21.0	
		4233	846.6	21.2	
	Subtest 4	4132	826.4	21.3	0.5
		4183	836.6	21.3	
		4233	846.6	21.5	

7.2.2. WCDMA BAND 2

Test Engineer ID:	10615	Test Date:	10/27/2020
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Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	MPR (dB)
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.3	N/A
		9400	1880.0	23.1	
		9538	1907.6	23.0	
HSDPA	Subtest 1	9262	1852.4	22.0	0
		9400	1880.0	21.8	
		9538	1907.6	21.7	
	Subtest 2	9262	1852.4	21.9	0
		9400	1880.0	21.7	
		9538	1907.6	21.6	
	Subtest 3	9262	1852.4	21.8	0.5
		9400	1880.0	21.8	
		9538	1907.6	21.7	
	Subtest 4	9262	1852.4	21.9	0.5
		9400	1880.0	21.8	
		9538	1907.6	21.6	
HSUPA	Subtest 1	9262	1852.4	20.9	0
		9400	1880.0	20.9	
		9538	1907.6	20.7	
	Subtest 2	9262	1852.4	19.0	2
		9400	1880.0	18.8	
		9538	1907.6	18.6	
	Subtest 3	9262	1852.4	20.0	1
		9400	1880.0	19.9	
		9538	1907.6	19.7	
	Subtest 4	9262	1852.4	18.8	2
		9400	1880.0	18.7	
		9538	1907.6	18.6	
	Subtest 5	9262	1852.4	20.9	0
		9400	1880.0	20.9	
		9538	1907.6	20.7	
DC-HSDPA	Subtest 1	9262	1852.4	21.9	0
		9400	1880.0	21.7	
		9538	1907.6	21.6	
	Subtest 2	9262	1852.4	21.9	0
		9400	1880.0	21.7	
		9538	1907.6	21.5	
	Subtest 3	9262	1852.4	21.9	0.5
		9400	1880.0	21.7	
		9538	1907.6	21.5	
	Subtest 4	9262	1852.4	21.9	0.5
		9400	1880.0	21.8	
		9538	1907.6	21.5	

7.2.3. WCDMA BAND 4

Test Engineer ID:	10615	Test Date:	10/27/2020
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Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)	MPR (dB)
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	23.3	N/A
		1413	1732.6	23.3	
		1513	1752.6	23.2	
HSDPA	Subtest 1	1312	1712.4	19.8	0
		1413	1732.6	19.8	
		1513	1752.6	19.5	
	Subtest 2	1312	1712.4	21.8	0
		1413	1732.6	21.9	
		1513	1752.6	20.9	
	Subtest 3	1312	1712.4	21.5	0.5
		1413	1732.6	21.5	
		1513	1752.6	21.0	
	Subtest 4	1312	1712.4	21.5	0.5
		1413	1732.6	21.5	
		1513	1752.6	21.0	
HSUPA	Subtest 1	1312	1712.4	20.3	0
		1413	1732.6	20.4	
		1513	1752.6	19.6	
	Subtest 2	1312	1712.4	19.8	2
		1413	1732.6	19.9	
		1513	1752.6	19.5	
	Subtest 3	1312	1712.4	19.9	1
		1413	1732.6	19.9	
		1513	1752.6	19.1	
	Subtest 4	1312	1712.4	18.8	2
		1413	1732.6	18.8	
		1513	1752.6	18.1	
	Subtest 5	1312	1712.4	20.3	0
		1413	1732.6	20.4	
		1513	1752.6	19.6	
DC-HSDPA	Subtest 1	1312	1712.4	19.7	0
		1413	1732.6	19.7	
		1513	1752.6	19.5	
	Subtest 2	1312	1712.4	21.8	0
		1413	1732.6	21.6	
		1513	1752.6	21.2	
	Subtest 3	1312	1712.4	21.5	0.5
		1413	1732.6	21.5	
		1513	1752.6	21.1	
	Subtest 4	1312	1712.4	21.5	0.5
		1413	1732.6	21.5	
		1513	1752.6	21.1	

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Worse case plots are reported only.

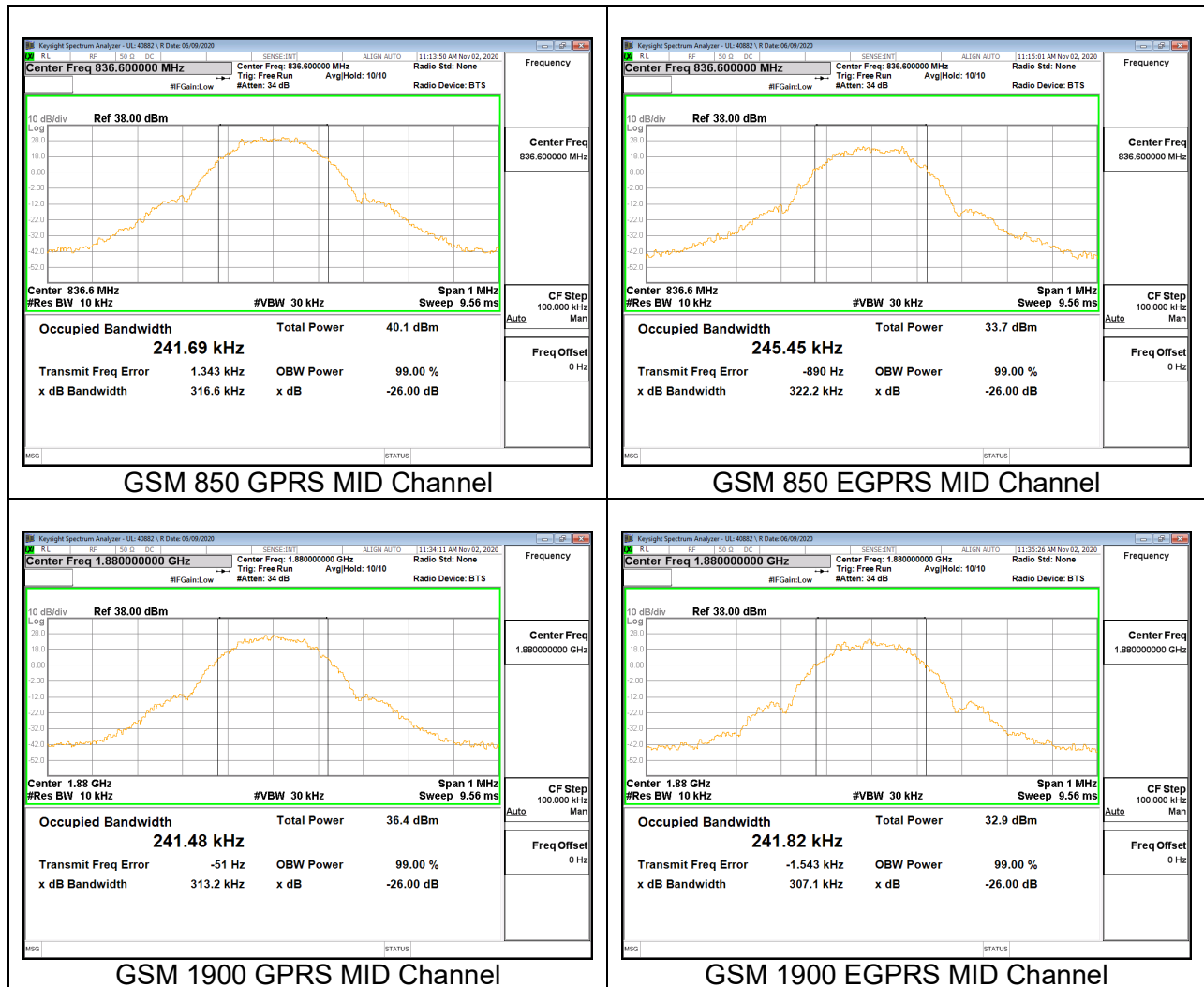
GSM

Band	Modulation	Channel	f(MHz)	99% BW (kHz)	-26dB BW (kHz)
850	GPRS	190	836.6	241.69	316.6
	EGPRS			245.45	322.2
1900	GPRS	661	1880.0	241.48	313.2
	EGPRS			241.82	307.1

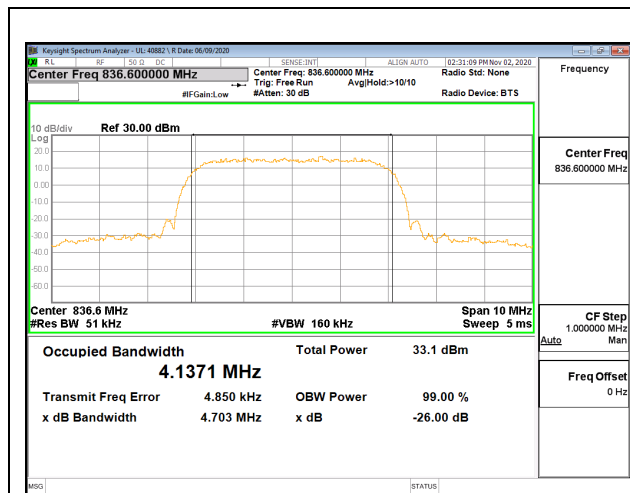
WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND5	REL 99	4408	836.6	4.1371	4.703
	HSDPA			4.1381	4.720
BAND2	REL 99	9800	1880.0	4.1303	4.720
	HSDPA			4.1349	4.693
BAND4	REL 99	1638	1732.6	4.1259	4.694
	HSDPA			4.1458	4.724

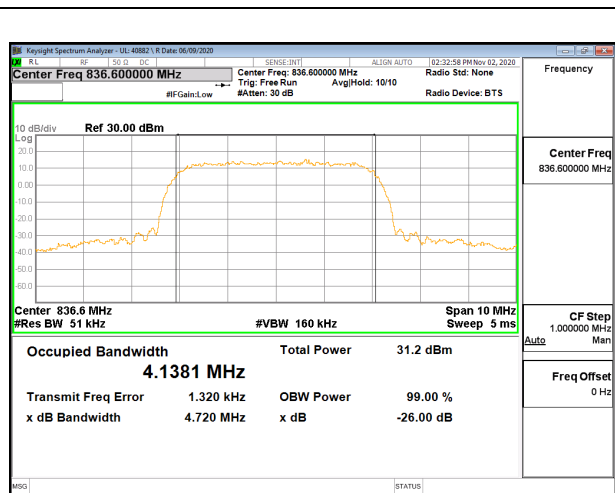
8.1.1. GSM



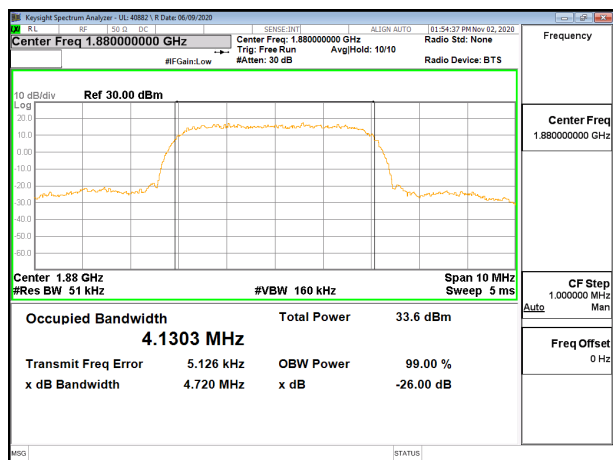
8.1.2. WCDMA



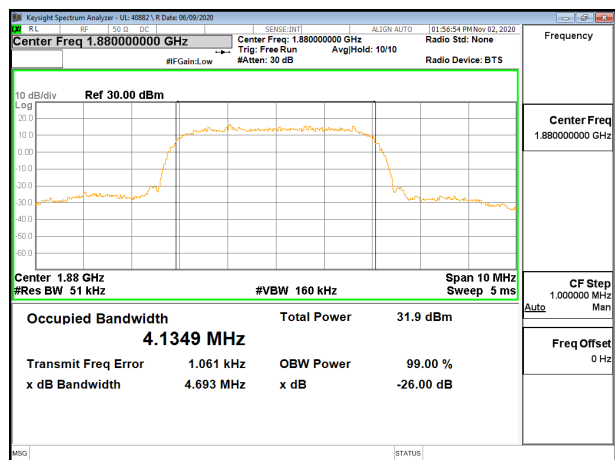
BAND 5 Rel 99 MID Channel



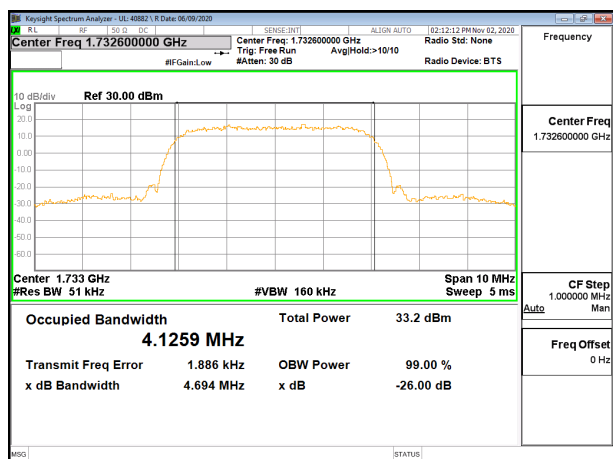
BAND 5 HSDPA MID Channel



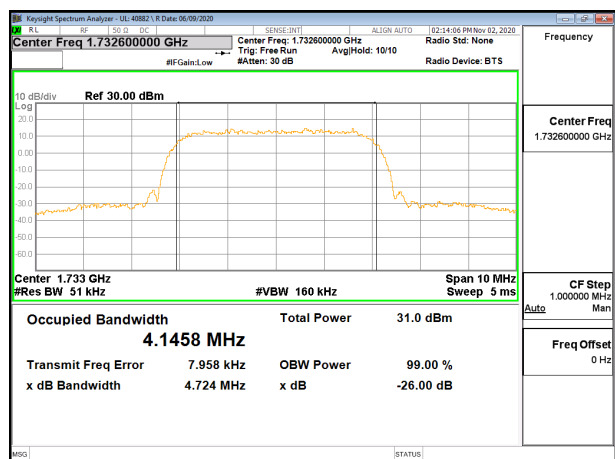
BAND 2 Rel 99 MID Channel



BAND 2 HSDPA MID Channel



BAND 4 Rel 99 MID Channel



BAND 4 HSDPA MID Channel

8.2. BAND EDGE AND EMISSION MASK

LIMITS

FCC: §22.1051, §22.917, §24.238, §27.53

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

The transmitter output was connected to a R&S CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

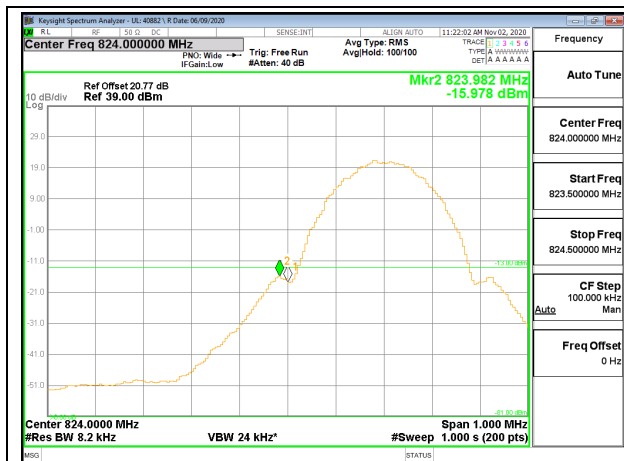
RESULTS

8.2.1. GSM 850

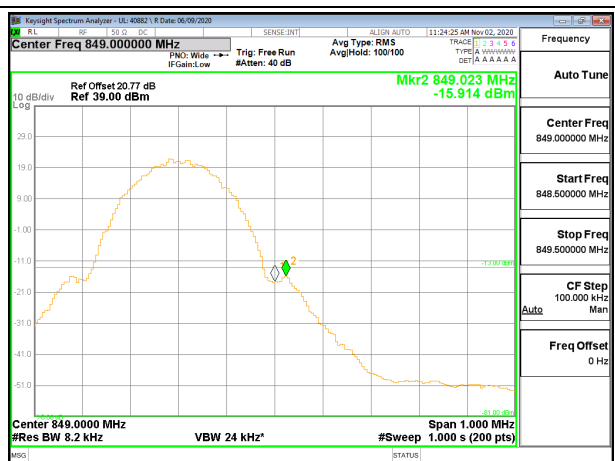
LIMITS

FCC: §22.917

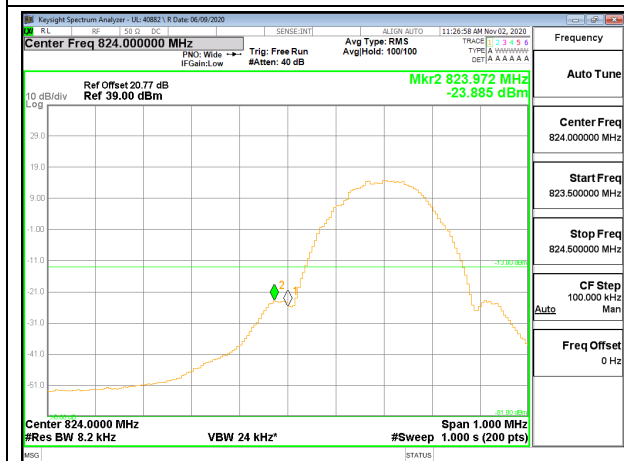
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



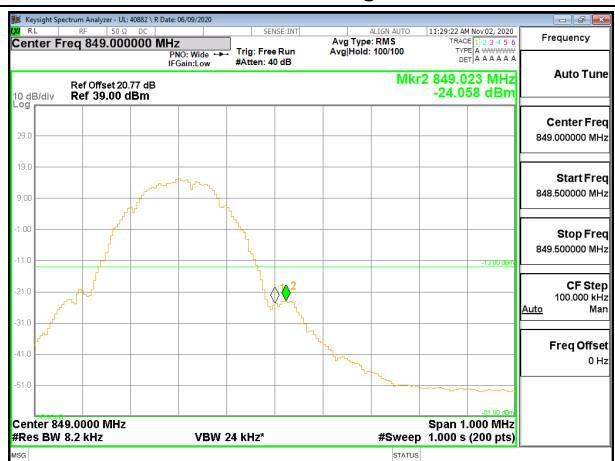
GSM 850 GPRS Low Channel



GSM 850 GPRS High Channel



GSM 850 EGPRS Low Channel



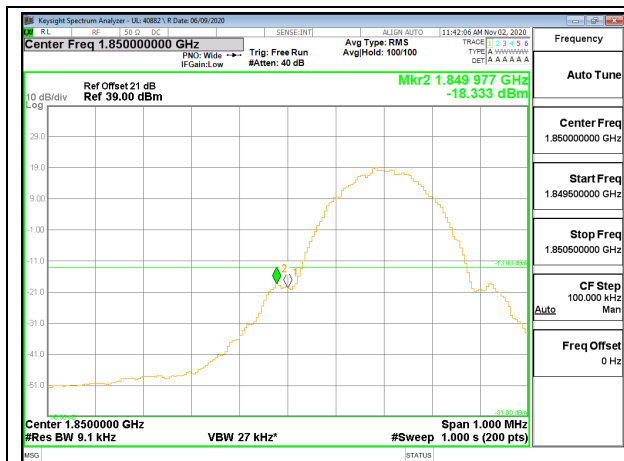
GSM 850 EGPRS High Channel

8.2.2. GSM 1900

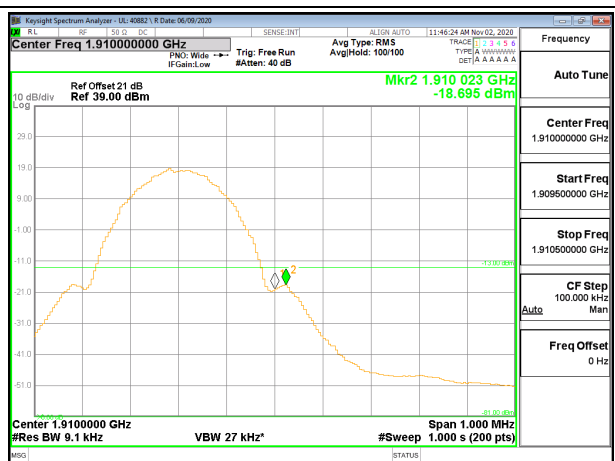
LIMITS

FCC: §24.238

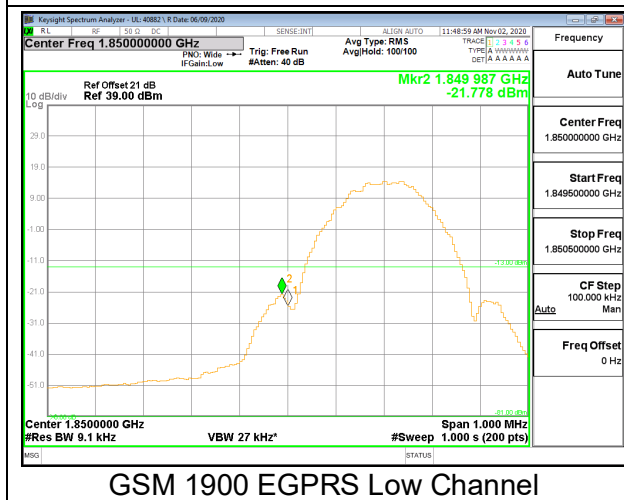
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



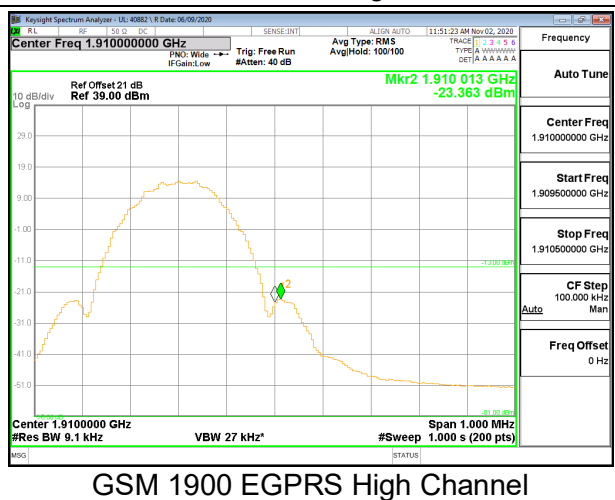
GSM 1900 GPRS Low Channel



GSM 1900 GPRS High Channel



GSM 1900 EGPRS Low Channel



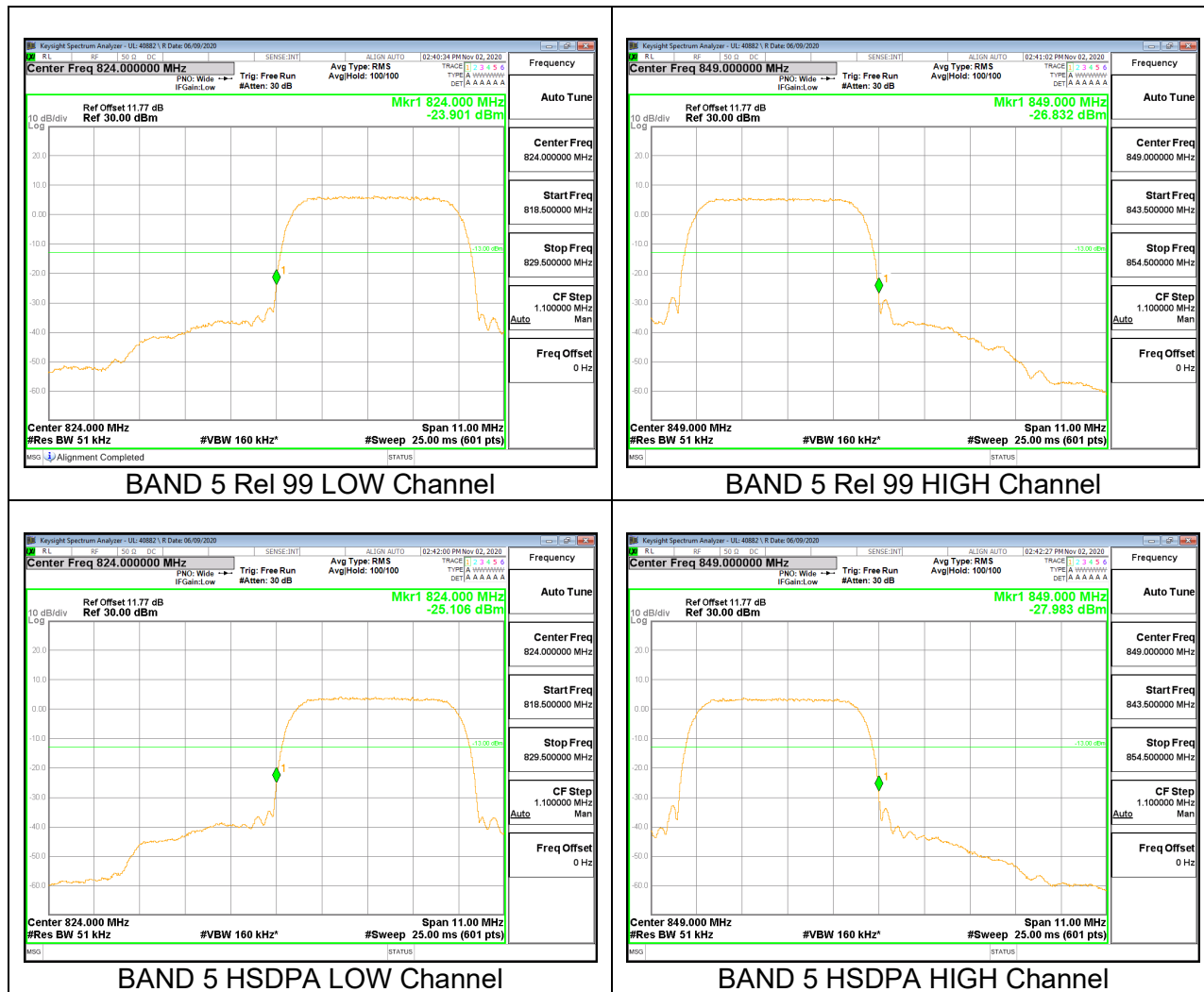
GSM 1900 EGPRS High Channel

8.2.3. WCDMA BAND 5

LIMITS

FCC: §22.917

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

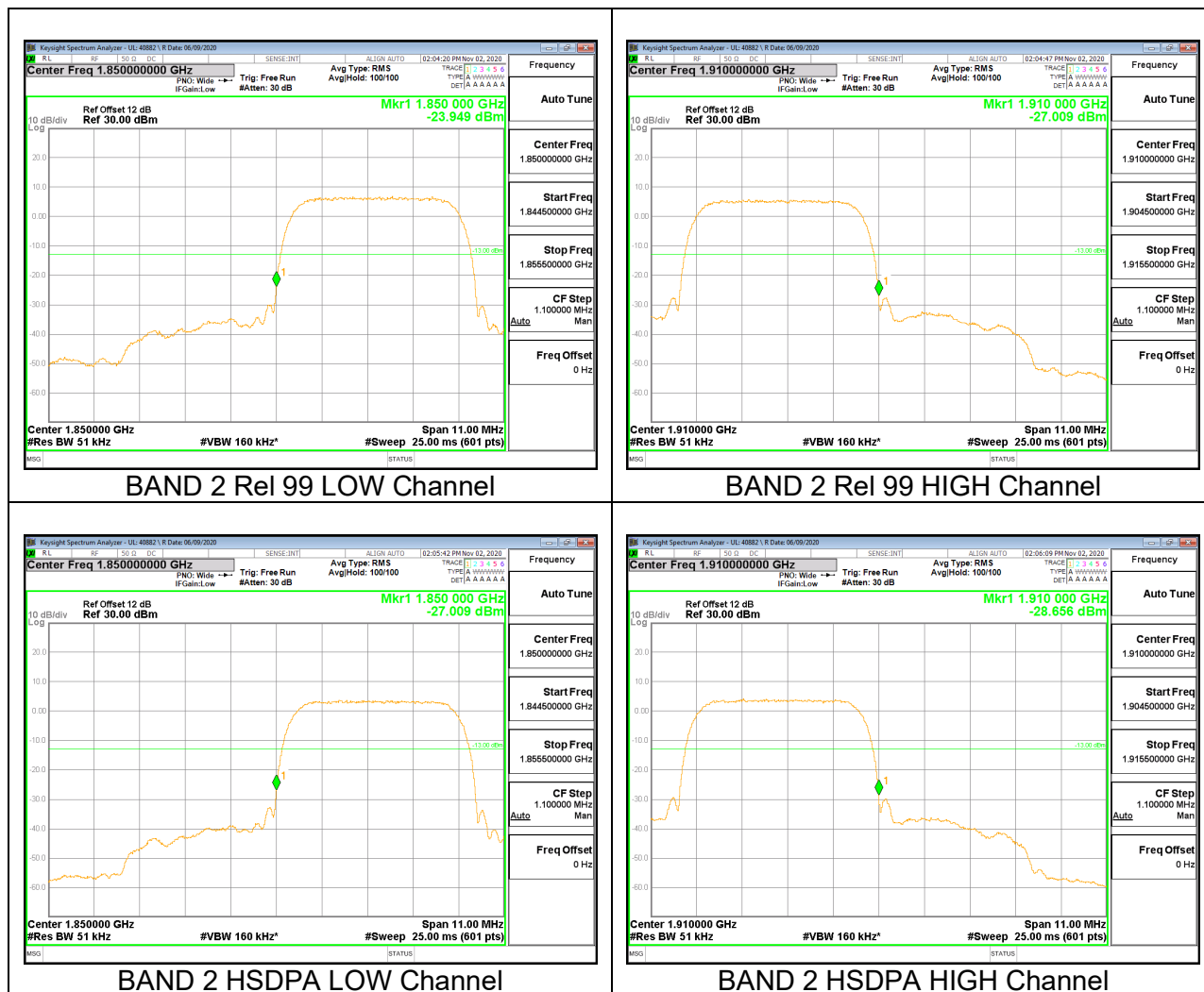


8.2.4. WCDMA BAND 2

LIMITS

FCC: §24.238

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

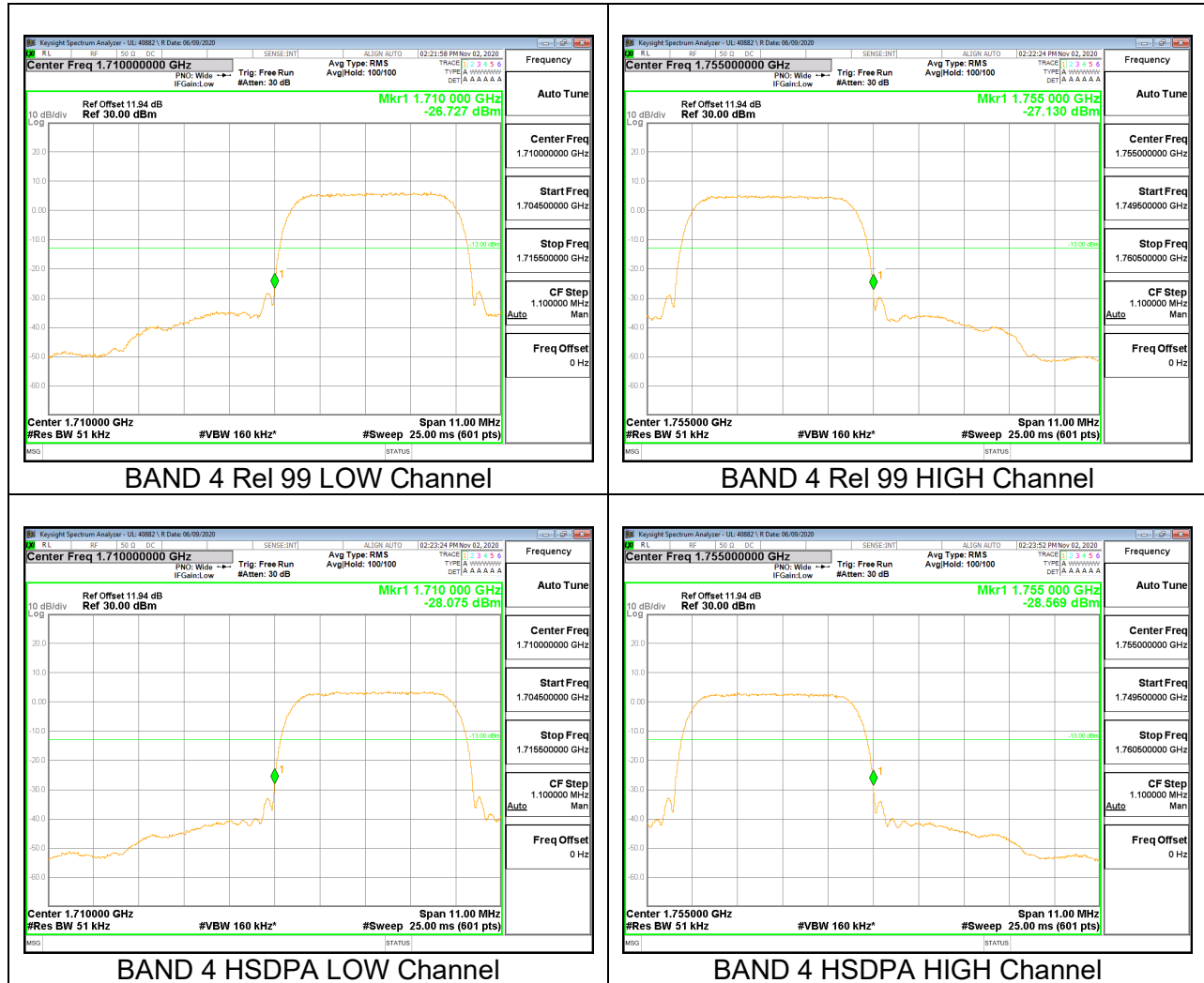


8.2.5. WCDMA BAND 4

LIMITS

FCC: §27.53(h)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917, §24.238 and §27.53

LIMITS

FCC: §22.917, §24.238, §27.53 (h)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

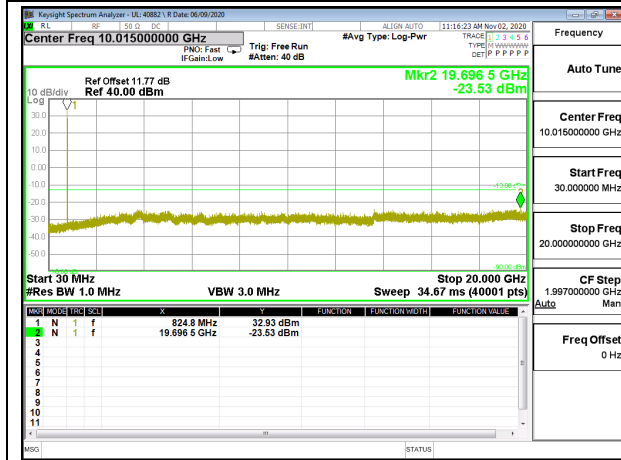
RESULTS

8.3.1. GSM 850

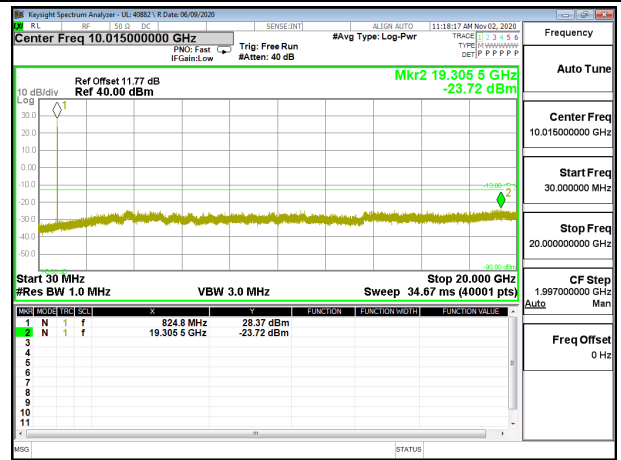
LIMITS

FCC: §22.917

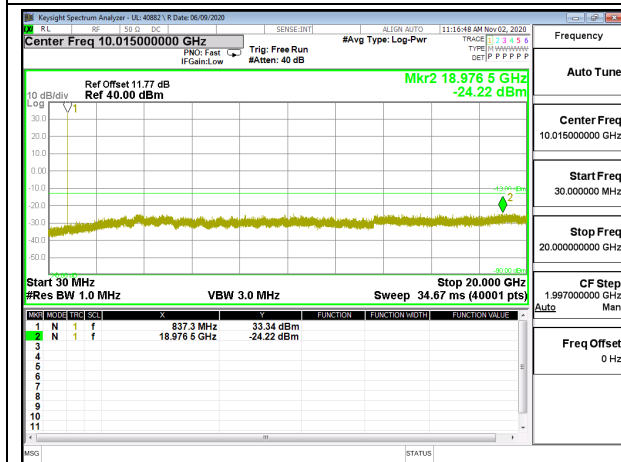
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



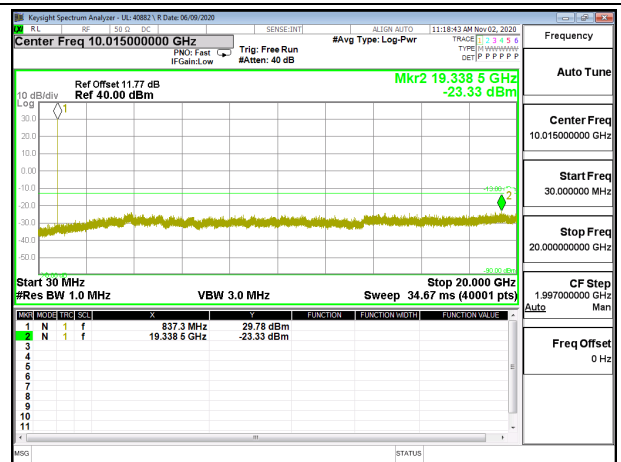
GSM 850 GPRS Low Channel



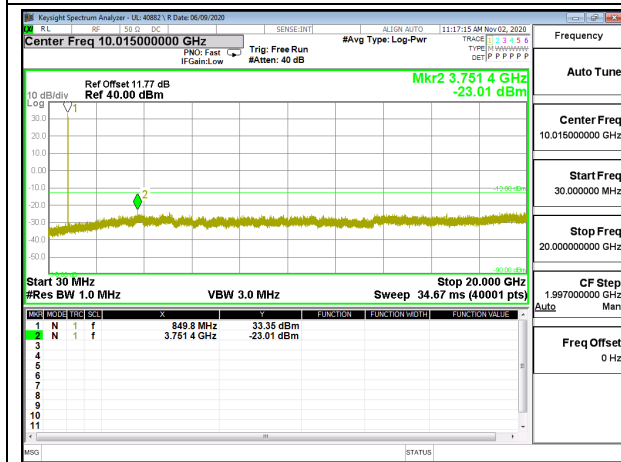
GSM 850 EGPRS Low Channel



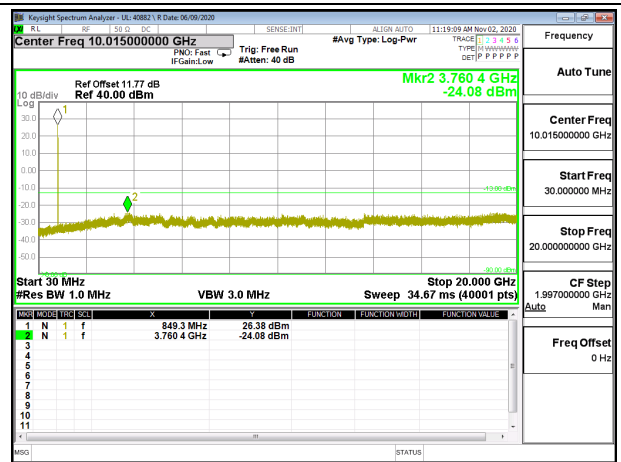
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



GSM 850 GPRS High Channel



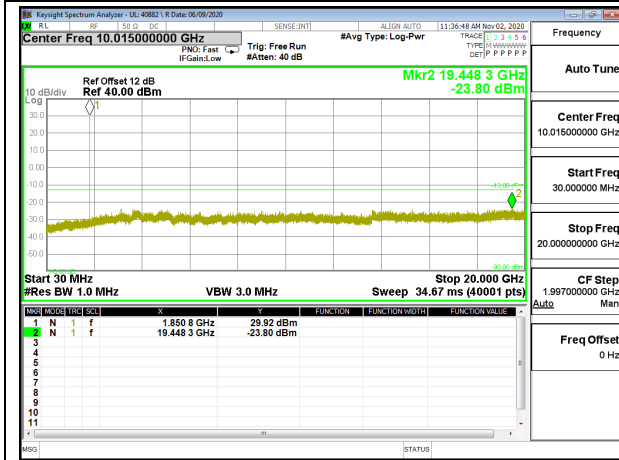
GSM 850 EGPRS High Channel

8.3.2. GSM 1900

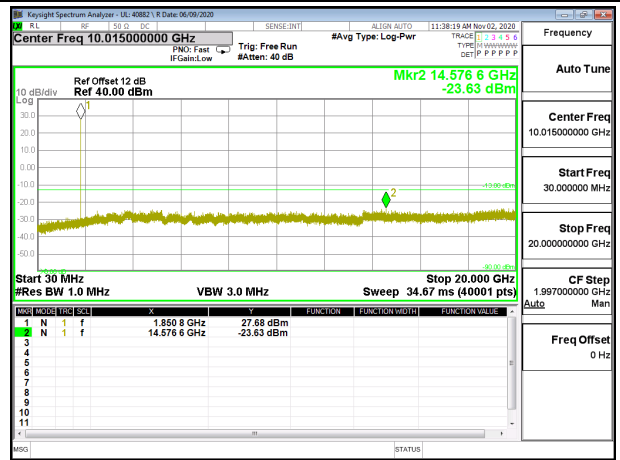
LIMITS

FCC: §24.238

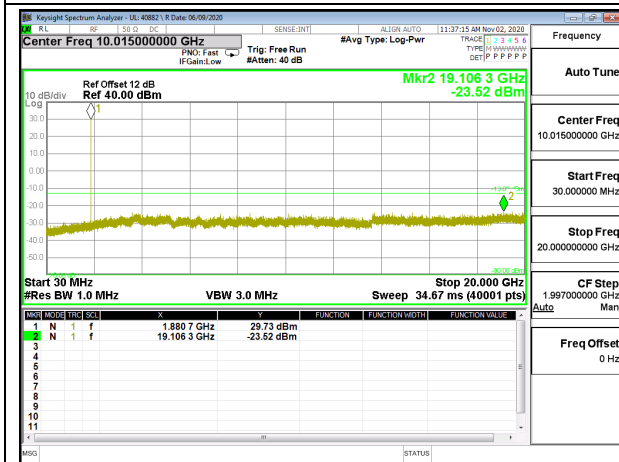
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



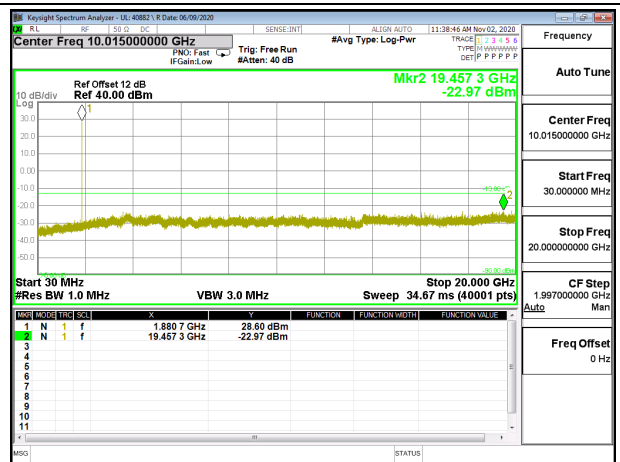
GSM 1900 GPRS Low Channel



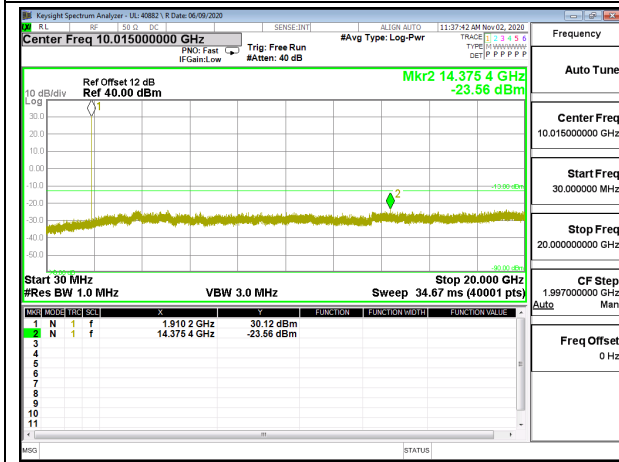
GSM 1900 EGPRS Low Channel



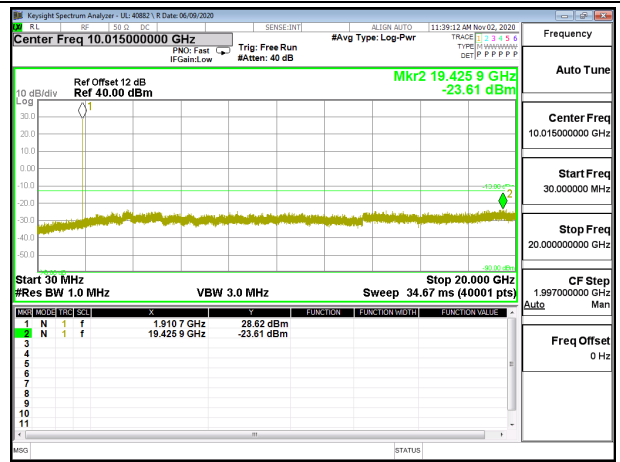
GSM 1900 GPRS Middle Channel



GSM 1900 EGPRS Middle Channel



GSM 1900 GPRS High Channel



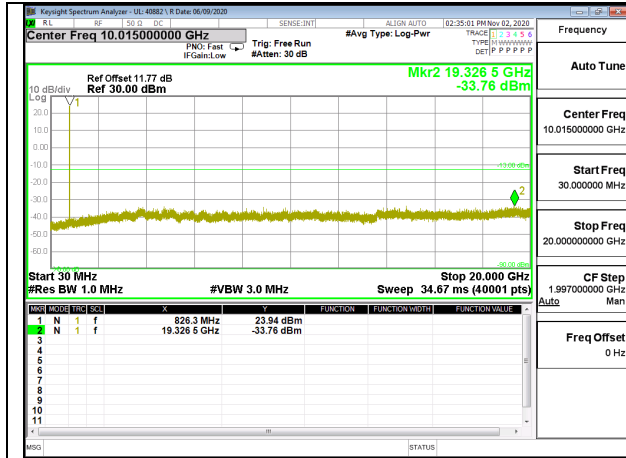
GSM 1900 EGPRS High Channel

8.3.3. WCDMA BAND 5

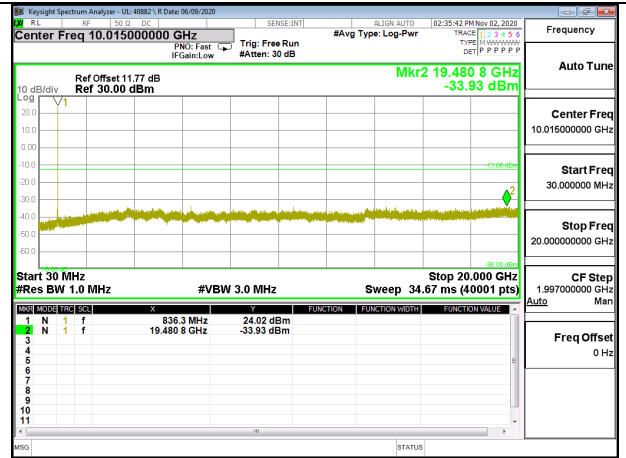
LIMITS

FCC: §22.917

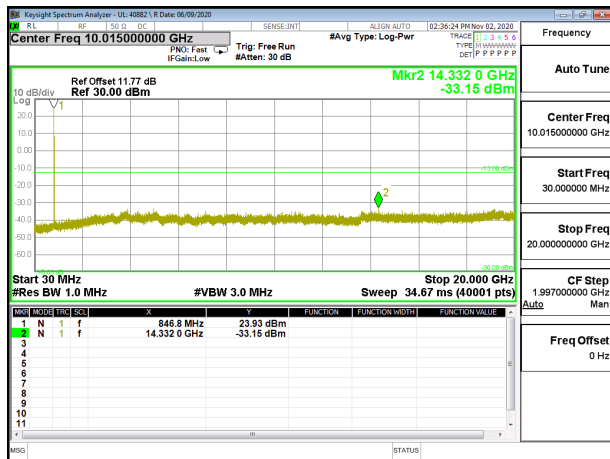
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.



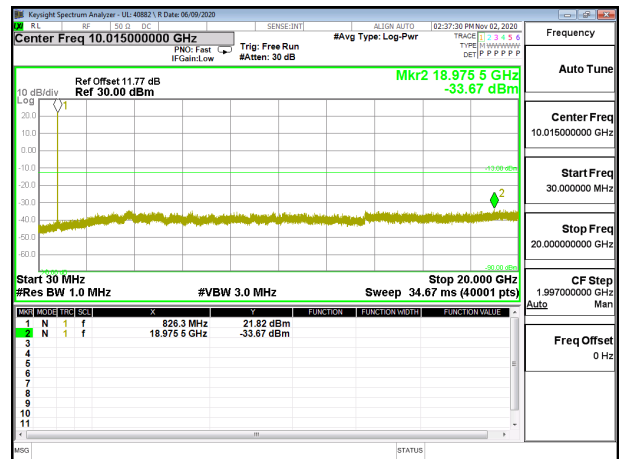
BAND 5 Rel 99 LOW Channel



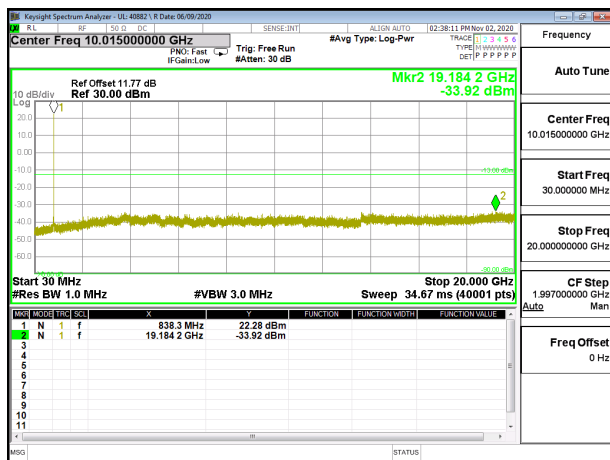
BAND 5 Rel 99 MID Channel



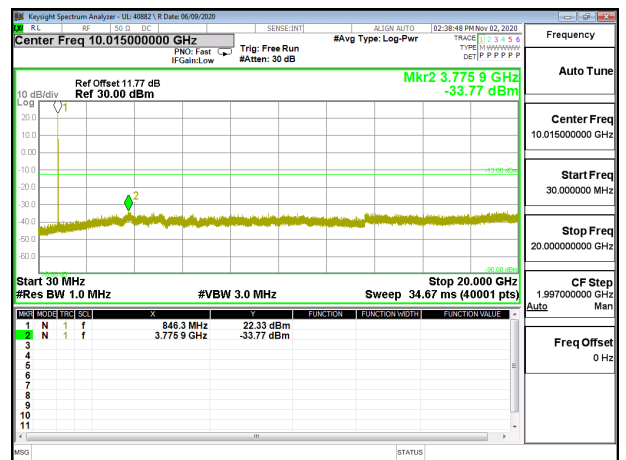
BAND 5 Rel 99 HIGH Channel



BAND 5 HSDPA LOW Channel



BAND 5 HSDPA MID Channel



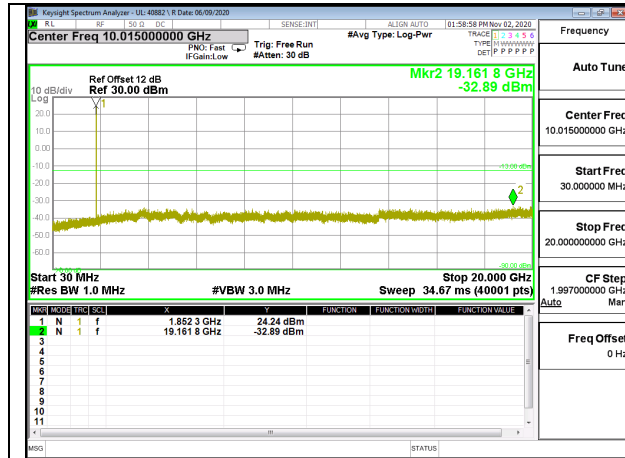
BAND 5 HSDPA HIGH Channel

8.3.4. WCDMA BAND 2

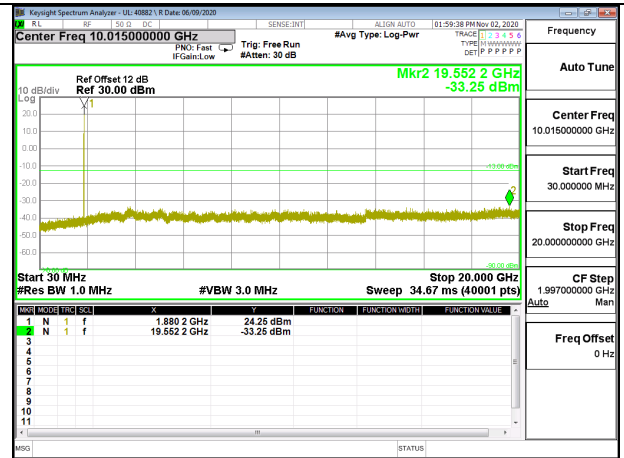
LIMITS

FCC: §24.238

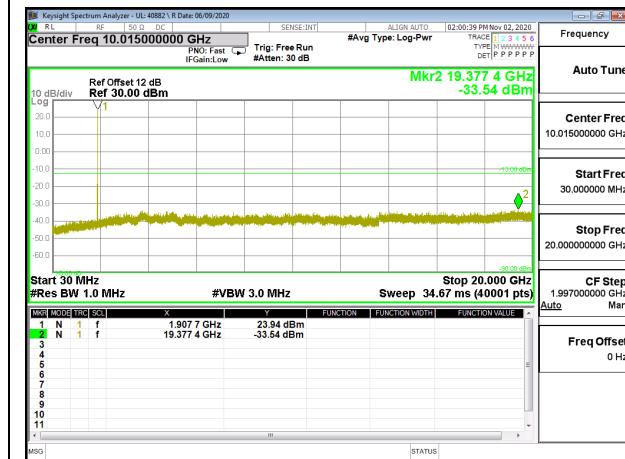
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



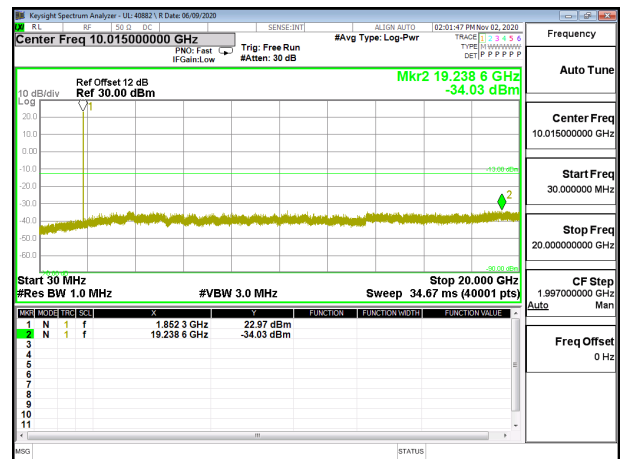
BAND 2 Rel 99 LOW Channel



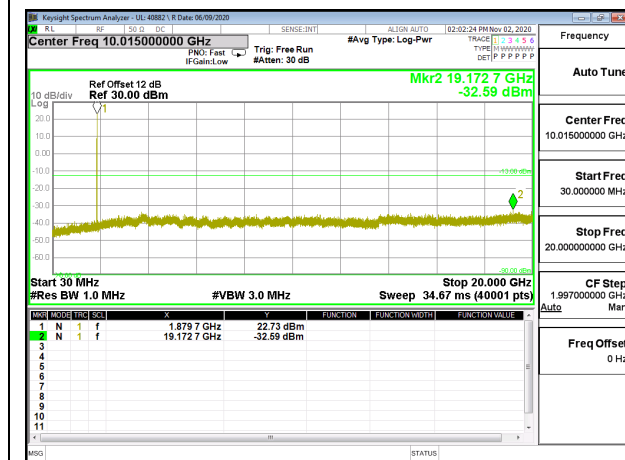
BAND 2 Rel 99 MID Channel



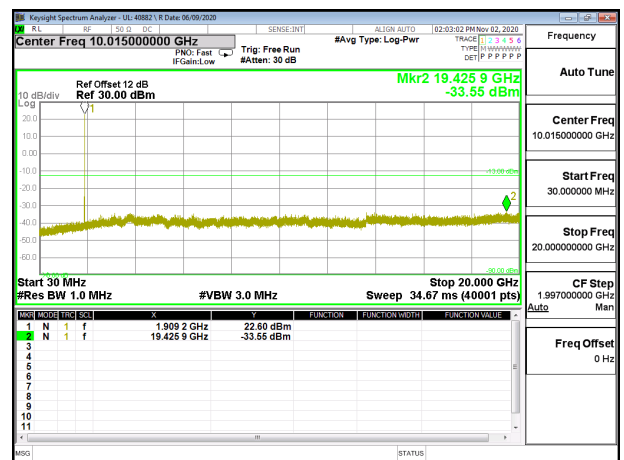
BAND 2 Rel 99 HIGH Channel



BAND 2 HSDPA LOW Channel



BAND 2 HSDPA MID Channel



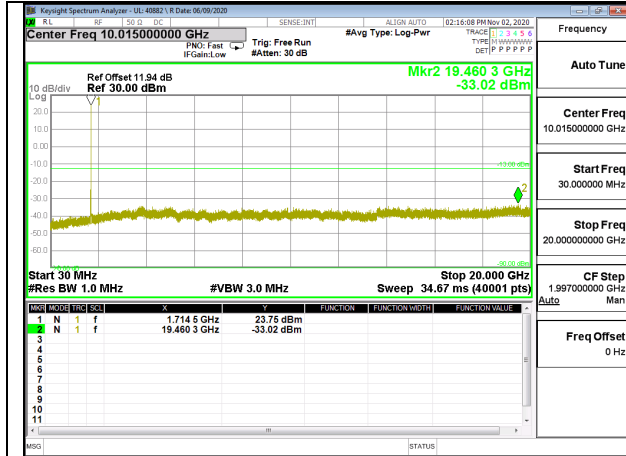
BAND 2 HSDPA HIGH Channel

8.3.5. WCDMA BAND 4

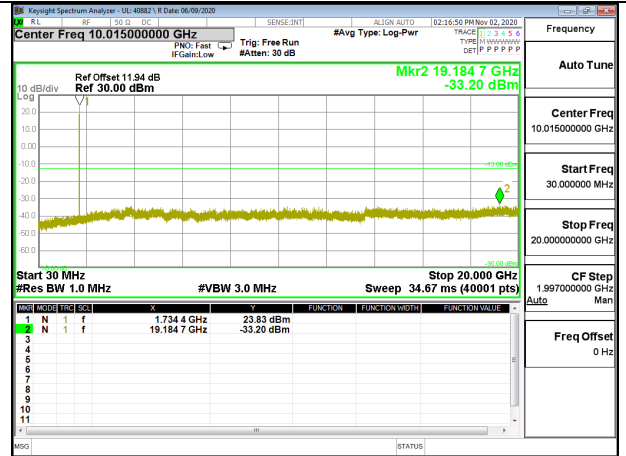
LIMITS

FCC: §27.53(h)

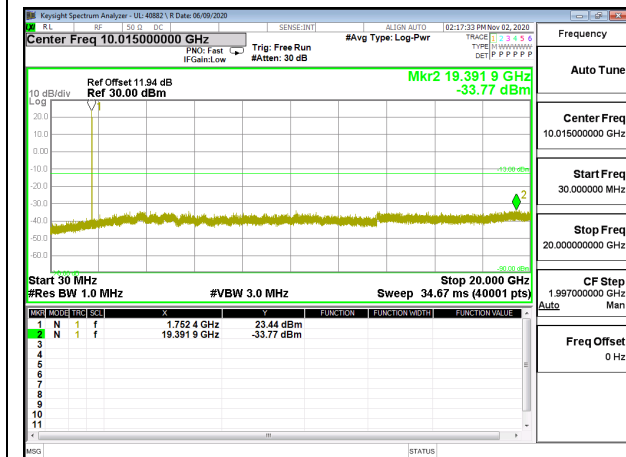
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.



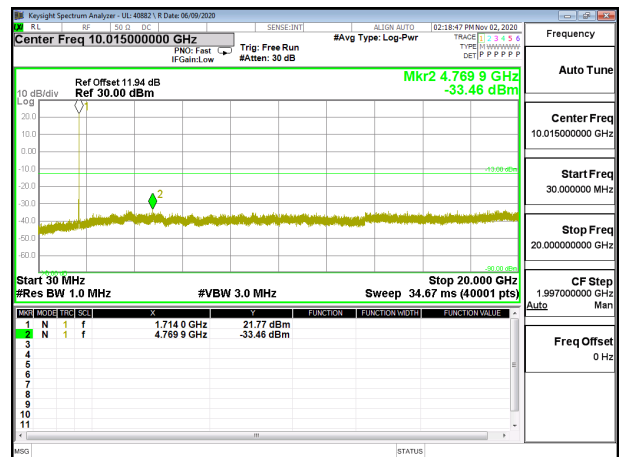
BAND 4 Rel 99 LOW Channel



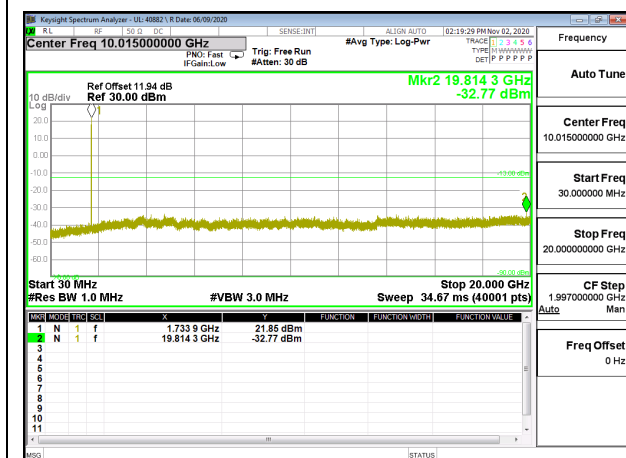
BAND 4 Rel 99 MID Channel



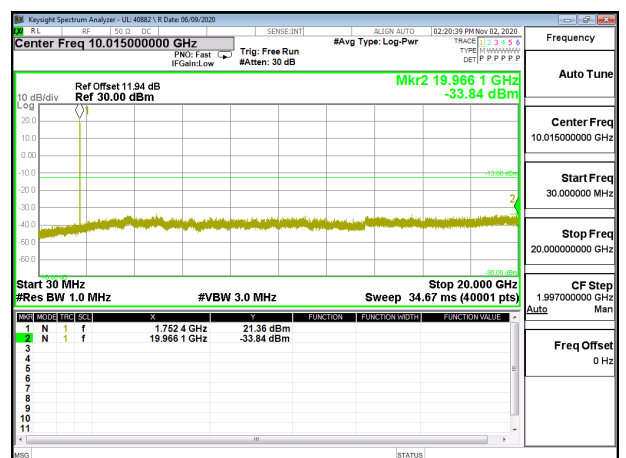
BAND 4 Rel 99 HIGH Channel



BAND 4 HSDPA LOW Channel



BAND 4 HSDPA MID Channel



BAND 4 HSDPA HIGH Channel

8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235 and §27.54

LIMITS

FCC §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC §24.235 & §27.54

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30°C to $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.

End Voltage, 2.7VDC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

8.4.1. GSM

LIMITS

FCC §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC §24.235

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

FCC §27.54

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

Test Engineer ID:	40882	Test Date:	2020-11-09 – 2020-11-16
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GPRS 850

Limit		824.2	848.8	Delta (Hz) LOW	Delta (Hz) HIGH	Frequency Stability (ppm) LOW	Frequency Stability (ppm) HIGH
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	824.2000	848.8000				
Extreme (50C)		824.2000	848.8000	-1.69	-3.31	-0.0020	-0.0040
Extreme (40C)		824.2000	848.8000	-4.23	-3.59	-0.0051	-0.0043
Extreme (30C)		824.2000	848.8000	-3.36	-2.15	-0.0040	-0.0026
Extreme (10C)		824.2000	848.8000	-2.41	-3.50	-0.0029	-0.0042
Extreme (0C)		824.2000	848.8000	-0.49	-1.57	-0.0006	-0.0019
Extreme (-10C)		824.2000	848.8000	-6.10	-2.56	-0.0073	-0.0031
Extreme (-20C)		824.2000	848.8000	3.20	2.94	0.0038	0.0035
Extreme (-30C)		824.2000	848.8000	-0.16	1.13	-0.0002	0.0014
20C		15%	824.2000	848.8000	2.41	2.46	0.0029
	-15%	824.2000	848.8000	-2.67	1.52	-0.0032	0.0018
	End Point	824.2000	848.8000	9.54	-0.21	0.0114	-0.0003

GPRS 1900

Limit		1850.2	1909.3	Delta (Hz) LOW	Delta (Hz) HIGH	Frequency Stability (ppm) LOW	Frequency Stability (ppm) HIGH
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	1850.2000	1909.3000				
Extreme (50C)		1850.2000	1909.3000	-2.41	-3.04	-0.0013	-0.0016
Extreme (40C)		1850.2000	1909.3000	-3.49	-5.23	-0.0019	-0.0028
Extreme (30C)		1850.2000	1909.3000	-1.14	-2.00	-0.0006	-0.0011
Extreme (10C)		1850.2000	1909.3000	-1.64	-3.36	-0.0009	-0.0018
Extreme (0C)		1850.2000	1909.3000	-2.87	-2.64	-0.0015	-0.0014
Extreme (-10C)		1850.2000	1909.3000	-5.61	-6.35	-0.0030	-0.0034
Extreme (-20C)		1850.2000	1909.3000	3.01	-2.45	0.0016	-0.0013
Extreme (-30C)		1850.2000	1909.3000	-2.26	-1.67	-0.0012	-0.0009
20C		15%	1850.2000	1909.3000	5.61	6.61	0.0030
	-15%	1850.2000	1909.3000	-0.77	9.45	-0.0004	0.0050
	End Point	1850.2000	1909.3000	3.81	-6.23	0.0020	-0.0033

8.4.2. WCDMA

LIMITS

FCC §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC §24.235

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

FCC §27.54

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

Test Engineer ID:	40882	Test Date:	2020-11-09 – 2020-11-16
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WCDMA REL 99 BAND 5

Limit		826.4	846.6	Delta (Hz) LOW	Delta (Hz) HIGH	Frequency Stability (ppm) LOW	Frequency Stability (ppm) HIGH
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	826.4000	846.6000				
Extreme (50C)		826.4000	846.6000	-1.49	-2.50	-0.0018	-0.0030
Extreme (40C)		826.4000	846.6000	-1.49	-2.54	-0.0018	-0.0030
Extreme (30C)		826.4000	846.6000	-3.48	-1.54	-0.0042	-0.0018
Extreme (10C)		826.4000	846.6000	-0.99	-3.56	-0.0012	-0.0043
Extreme (0C)		826.4000	846.6000	-3.87	-2.61	-0.0046	-0.0031
Extreme (-10C)		826.4000	846.6000	-2.34	-3.54	-0.0028	-0.0042
Extreme (-20C)		826.4000	846.6000	-0.96	-3.09	-0.0011	-0.0037
Extreme (-30C)		826.4000	846.6000	-2.68	-5.14	-0.0032	-0.0061
20C		15%	826.4000	846.6000	0.07	-1.10	0.0001
	-15%	826.4000	846.6000	1.06	0.10	0.0013	0.0001
	End Point	826.4000	846.6000	-1.46	1.12	-0.0017	0.0013

WCDMA REL 99 BAND 2

Limit		1852.4	1907.6	Delta (Hz) LOW	Delta (Hz) HIGH	Frequency Stability (ppm) LOW	Frequency Stability (ppm) HIGH
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	1852.4000	1907.6000				
Extreme (50C)		1852.4000	1907.6000	-4.52	-1.41	-0.0024	-0.0008
Extreme (40C)		1852.4000	1907.6000	-4.51	-5.00	-0.0024	-0.0027
Extreme (30C)		1852.4000	1907.6000	-0.65	-1.67	-0.0003	-0.0009
Extreme (10C)		1852.4000	1907.6000	-1.23	-2.22	-0.0007	-0.0012
Extreme (0C)		1852.4000	1907.6000	-1.67	2.19	-0.0009	0.0012
Extreme (-10C)		1852.4000	1907.6000	-1.54	-2.30	-0.0008	-0.0012
Extreme (-20C)		1852.4000	1907.6000	-6.54	-4.71	-0.0035	-0.0025
Extreme (-30C)		1852.4000	1907.6000	3.61	-3.59	0.0019	-0.0019
20C		15%	1852.4000	1907.6000	2.83	1.37	0.0015
	-15%	1852.4000	1907.6000	0.14	1.97	0.0001	0.0010
	End Point	1852.4000	1907.6000	2.62	1.78	0.0014	0.0009

WCDMA REL 99 BAND 4

Limit		1712.4	1752.5	Delta (Hz) LOW	Delta (Hz) HIGH	Frequency Stability (ppm) LOW	Frequency Stability (ppm) HIGH
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	1712.4000	1752.5000				
Extreme (50C)		1712.4000	1752.5000	-2.10	-3.02	-0.0012	-0.0017
Extreme (40C)		1712.4000	1752.5000	-5.55	-6.06	-0.0032	-0.0035
Extreme (30C)		1712.4000	1752.5000	-3.67	-4.12	-0.0021	-0.0024
Extreme (10C)		1712.4000	1752.5000	-5.67	-3.73	-0.0033	-0.0022
Extreme (0C)		1712.4000	1752.5000	-4.19	-4.59	-0.0024	-0.0026
Extreme (-10C)		1712.4000	1752.5000	-6.66	-6.25	-0.0038	-0.0036
Extreme (-20C)		1712.4000	1752.5000	-7.15	5.94	-0.0041	0.0034
Extreme (-30C)		1712.4000	1752.5000	-5.67	4.99	-0.0033	0.0029
20C		15%	1712.4000	1752.5000	4.11	4.21	0.0024
	-15%	1712.4000	1752.5000	4.10	-4.12	0.0024	-0.0024
	End Point	1712.4000	1752.5000	4.10	4.10	0.0024	0.0024

8.5. PEAK TO AVERAGE RATIO

LIMITS

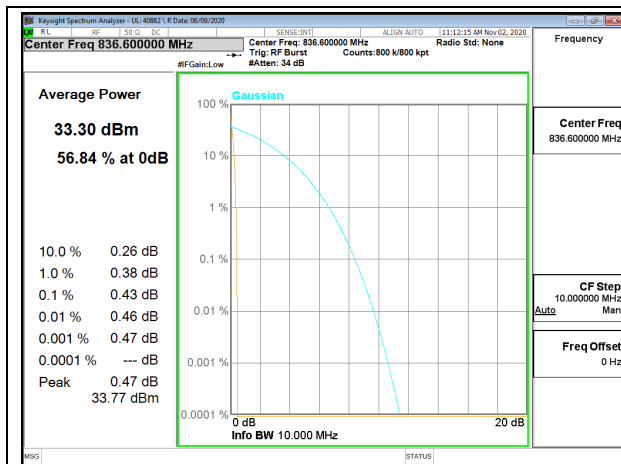
In addition, the peak to average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

RESULT

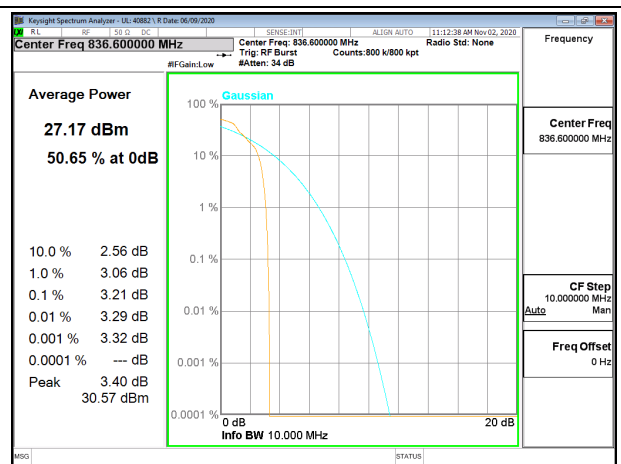
The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

8.5.1. GSM

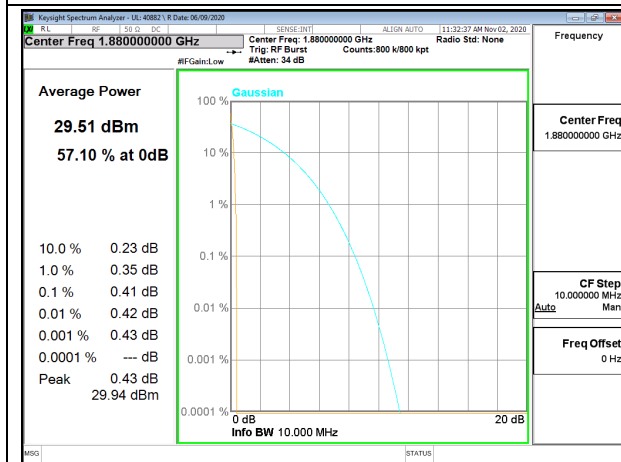
Test Engineer ID:	40882	Test Date:	2020-11-02
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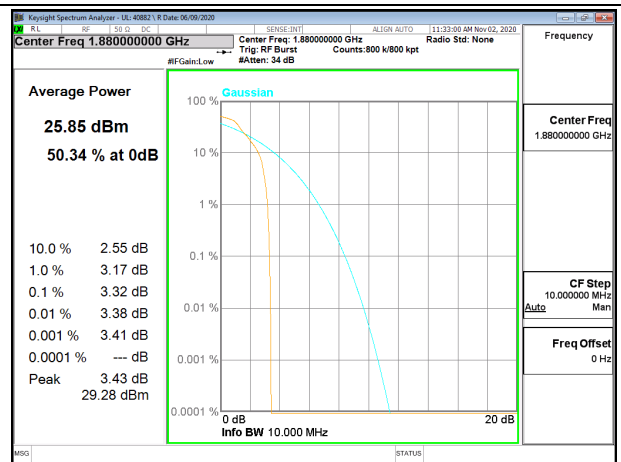
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



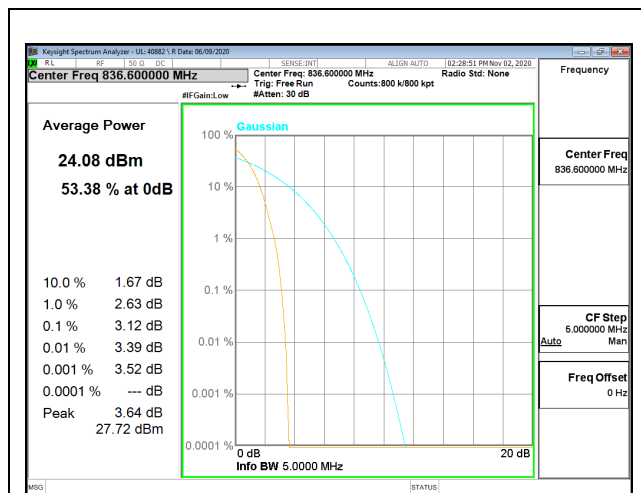
GSM 1900 GPRS Middle Channel



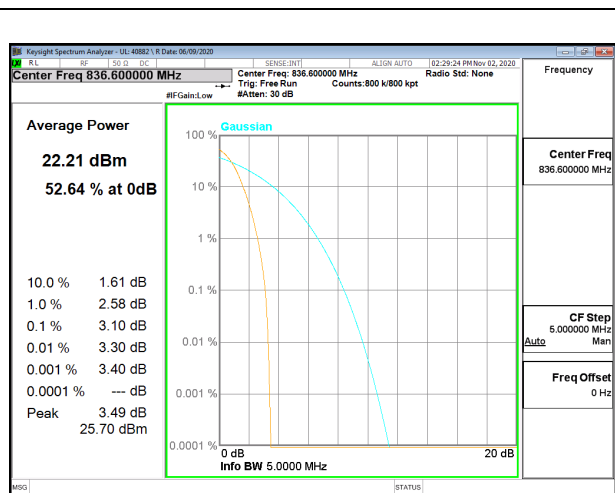
GSM 1900 EGPRS Middle Channel

8.5.2. WCDMA

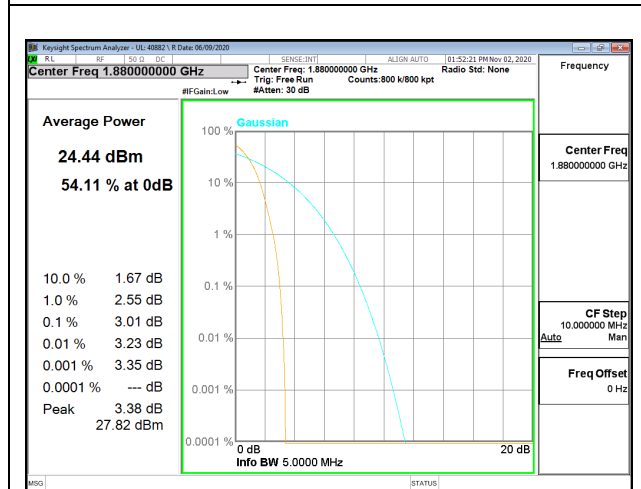
Test Engineer ID:	40882	Test Date:	2020-11-02
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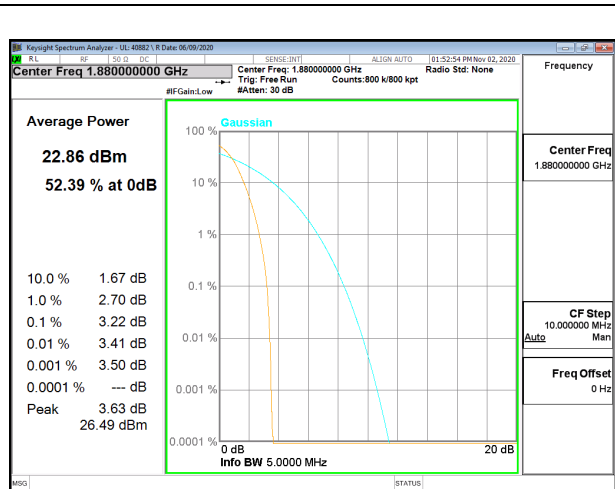
BAND 5 Rel 99 MID Channel



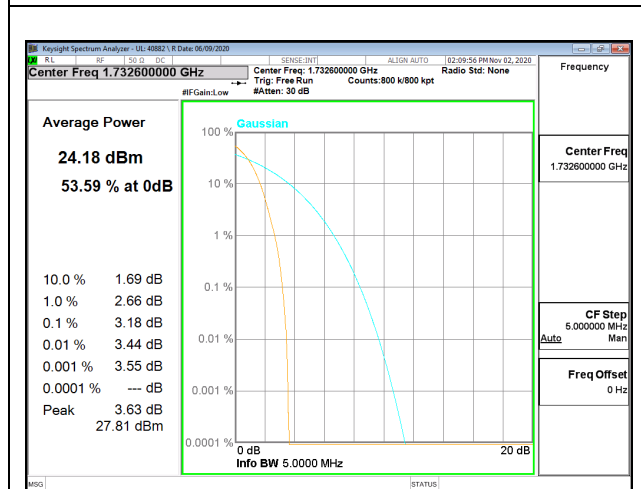
BAND 5 HSDPA MID Channel



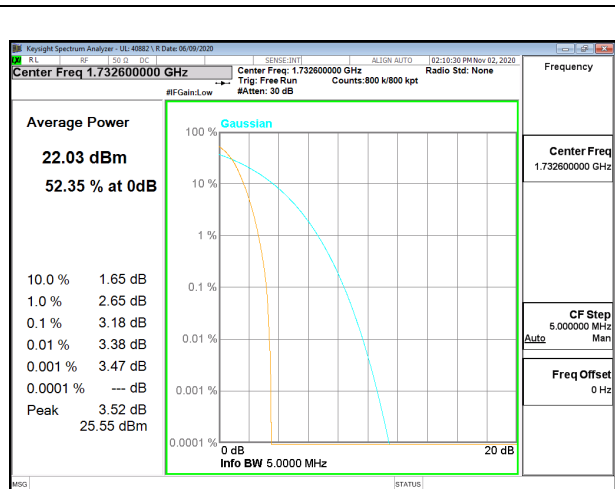
BAND 2 Rel 99 MID Channel



BAND 2 HSDPA MID Channel



BAND 4 Rel 99 MID Channel



BAND 4 HSDPA MID Channel

9. RADIATED TEST RESULTS

9.1. EFFECTIVE RADIATED POWER ERP/EIRP

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.50

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50(d) - (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1-watt EIRP.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603-E (2016), Clause 2.2.17; PSA setting reference to 971168 D01 v03r01

For peak power measurement with a PSA:

a) Set the RBW \geq OBW; b) Set VBW $\geq 3 \times$ RBW; c) Set span $\geq 2 \times$ RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points \geq span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW $\geq 3 \times$ RBW; d) Set number of points in sweep $\geq 2 \times$ span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98 ; h) Use trigger to capture bursts If burst duty cycle < 98 ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

MODES TESTED

GSM, WCMDA

TEST RESULTS

GSM

GSM 850				
Mode	Channel	f(MHz)	ERP	
			dBm	W
GPRS	128	824.2	18.95	0.078
	190	836.6	17.78	0.060
	251	848.8	19.54	0.090
EGPRS	128	824.2	12.35	0.017
	190	836.6	12.57	0.018
	251	848.8	13.38	0.022

GSM 1900				
Mode	Channel	f(MHz)	EIRP	
			dBm	W
GPRS	512	1850.2	25.43	0.349
	661	1880.0	26.08	0.405
	810	1909.8	26.31	0.427
EGPRS	512	1850.2	24.45	0.278
	661	1880.0	24.48	0.280
	810	1909.8	24.83	0.304

WCDMA

WCDMA					
Band	Mode	Channel	f(MHz)	EIRP/ERP	
				dBm	W
Band 5	REL99	4132	826.4	11.75	0.015
		4183	836.6	11.34	0.014
		4233	846.6	11.14	0.013
	HSDPA	4132	826.4	10.69	0.012
		4183	836.6	12.36	0.017
		4233	846.6	8.75	0.007
Band 2	REL99	9262	1852.4	16.10	0.041
		9400	1880	16.37	0.043
		9538	1907.6	16.26	0.042
	HSDPA	9262	1852.4	15.22	0.033
		9400	1880	12.00	0.016
		9538	1907.6	15.59	0.036
Band 4	REL99	1312	1712.4	15.00	0.032
		1413	1732.6	17.14	0.052
		1513	1752.6	16.70	0.047
	HSDPA	1312	1712.4	12.42	0.017
		1413	1732.6	14.49	0.028
		1513	1752.6	14.99	0.032

9.1.1. GSM

Company: Samsung								
Project #: 13548896								
Date: 11/19/2020, 11/20/2020								
Test Engineer: 11322								
Configuration: EUT w/Power Adapter & Headphones								
Location: S-SAC								
Mode	f	SG Reading	Polarity	Cable Loss	Antenna Gain	ERP	Limit	Delta
	MHz	dBm	H/V	dB	dBi	dBm	dBm	dB
GSM 850 GPRS	824.2	15.532	H	0.62	4.03	18.95	38.5	-19.55
	824.2	7.874	V	0.62	3.50	10.76	38.5	-27.74
	836.6	14.51	H	0.62	3.89	17.78	38.5	-20.72
	836.6	13.727	V	0.62	3.54	16.64	38.5	-21.86
	848.8	16.182	H	0.63	3.99	19.54	38.5	-18.96
	848.8	13.859	V	0.63	3.73	16.96	38.5	-21.54
GSM 850 EGPRS	824.2	8.202	H	0.62	4.03	11.62	38.5	-26.88
	824.2	9.464	V	0.62	3.50	12.35	38.5	-26.15
	836.6	9.3	H	0.62	3.89	12.57	38.5	-25.93
	836.6	7.237	V	0.62	3.54	10.15	38.5	-28.35
	848.8	10.022	H	0.63	3.99	13.38	38.5	-25.12
	848.8	7.549	V	0.63	3.73	10.65	38.5	-27.85

Company: Samsung								
Project #: 13548896								
Date: 11/19/2020, 11/20/2020								
Test Engineer: 11322								
Configuration: EUT w/Power Adapter & Headphones								
Location: S-SAC								
Mode	f	SG Reading	Polarity	Cable Loss	Antenna Gain	EIRP	Limit	Delta
	MHz	dBm	H/V	dB	dBi	dBm	dBm	dB
GSM 1900 GPRS	1850.2	22.194	H	0.97	2.929	24.15	33	-8.85
	1850.2	23.468	V	0.97	2.929	25.43	33	-7.57
	1880	21.178	H	0.98	2.929	23.13	33	-9.87
	1880	24.127	V	0.98	2.929	26.08	33	-6.92
	1909.8	22.251	H	0.99	3.187	24.45	33	-8.55
	1909.8	24.11	V	0.99	3.187	26.31	33	-6.69
GSM 1900 EGPRS	1850.2	20.874	H	0.97	2.929	22.83	33	-10.17
	1850.2	22.488	V	0.97	2.929	24.45	33	-8.55
	1880	20.688	H	0.98	2.929	22.64	33	-10.36
	1880	22.527	V	0.98	2.929	24.48	33	-8.52
	1909.8	20.661	H	0.99	3.187	22.86	33	-10.14
	1909.8	22.63	V	0.99	3.187	24.83	33	-8.17

9.1.2. WCDMA

Company: Samsung								
Project #: 13548896								
Date: 2020-11-20								
Test Engineer: 11322								
Configuration: EUT w/Power Adapter & Headphones								
Location: S-SAC								
Band	f	SG Reading	Polarity	Cable Loss	Antenna Gain	ERP	Limit	Delta
	MHz	dBm	H/V	dB	dBi	dBm	dBm	dB
WCDMA Band 5 REL99	826.4	8.361	H	0.62	4.01	11.75	38.5	-26.75
	826.4	1.638	V	0.62	3.49	4.51	38.5	-33.99
	836.6	8.07	H	0.62	3.89	11.34	38.5	-27.16
	836.6	6.247	V	0.62	3.54	9.16	38.5	-29.34
	846.6	7.784	H	0.63	3.98	11.14	38.5	-27.36
	846.6	5.865	V	0.63	3.70	8.94	38.5	-29.56
WCDMA Band 5 HSDPA	826.4	7.301	H	0.62	4.01	10.69	38.5	-27.81
	826.4	4.948	V	0.62	3.49	7.82	38.5	-30.68
	836.6	6.78	H	0.62	3.89	10.05	38.5	-28.45
	836.6	9.447	V	0.62	3.54	12.36	38.5	-26.14
	846.6	5.394	H	0.63	3.98	8.75	38.5	-29.75
	846.6	4.225	V	0.63	3.70	7.30	38.5	-31.20

Company: Samsung								
Project #: 13548896								
Date: 2020-11-20								
Test Engineer: 11322								
Configuration: EUT w/Power Adapter & Headphones								
Location: S-SAC								
Band	f	SG Reading	Polarity	Cable Loss	Antenna Gain	EIRP	Limit	Delta
	MHz	dBm	H/V	dB	dBi	dBm	dBm	dB
WCDMA Band 2 REL99	1852.4	13.835	H	0.97	2.929	15.79	33	-17.21
	1852.4	14.142	V	0.97	2.929	16.10	33	-16.90
	1880	11.961	H	0.98	2.929	13.91	33	-19.09
	1880	14.421	V	0.98	2.929	16.37	33	-16.63
	1907.6	12.932	H	0.99	3.187	15.13	33	-17.87
	1907.6	14.058	V	0.99	3.187	16.26	33	-16.74
WCDMA Band 2 HSDPA	1852.4	12.025	H	0.97	2.929	13.98	33	-19.02
	1852.4	13.262	V	0.97	2.929	15.22	33	-17.78
	1880	10.051	H	0.98	2.929	12.00	33	-21.00
	1880	3.381	V	0.98	2.929	5.33	33	-27.67
	1907.6	11.892	H	0.99	3.187	14.09	33	-18.91
	1907.6	13.388	V	0.99	3.187	15.59	33	-17.41

Company: Samsung
Project #: 13548896
Date: 2020-11-20
Test Engineer: 11322
Configuration: EUT w/Power Adapter & Headphones
Location: S-SAC

Band	f	SG Reading	Polarity	Cable Loss	Antenna Gain	EIRP	Limit	Delta
	MHz	dBm	H/V	dB	dBi	dBm	dBm	dB
WCDMA Band 4 REL99	1712.4	12.157	H	0.93	3.773	15.00	30	-15.00
	1712.4	10.614	V	0.93	3.773	13.46	30	-16.54
	1732.6	14.302	H	0.93	3.773	17.14	30	-12.86
	1732.6	12.564	V	0.93	3.773	15.41	30	-14.59
	1752.6	14.221	H	0.94	3.419	16.70	30	-13.30
	1752.6	12.599	V	0.94	3.419	15.08	30	-14.92
WCDMA Band 4 HSDPA	1712.4	9.577	H	0.93	3.773	12.42	30	-17.58
	1712.4	7.844	V	0.93	3.773	10.69	30	-19.31
	1732.6	11.652	H	0.93	3.773	14.49	30	-15.51
	1732.6	9.874	V	0.93	3.773	12.72	30	-17.28
	1752.6	12.511	H	0.94	3.419	14.99	30	-15.01
	1752.6	10.679	V	0.94	3.419	13.16	30	-16.84

9.2. FIELD STRENGTH OF SPURIOUS RADIATION ABOVE 1GHz

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

LIMITS

FCC: §22.917(a), §24.238(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

KDB 971168 D01 v02r02/D02 v01

MODES TESTED

GSM, WCDMA

RESULTS

9.2.1. GSM 850

GPRS Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/824.2MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.64846	-46.65	Pk	28.7	-34.8	.5	11.8	-40.45	-13	-27.45	0-360	299	H
2	2.47242	-44.63	Pk	32.5	-34.2	.4	11.8	-34.13	-13	-21.13	0-360	101	H
3	9.82501	-70.51	Pk	36.8	-26	.7	11.8	-47.21	-13	-34.21	0-360	101	H
4	1.64846	-45.57	Pk	28.7	-34.8	.5	11.8	-39.37	-13	-26.37	0-360	299	V
5	2.47242	-46.23	Pk	32.5	-34.2	.4	11.8	-35.73	-13	-22.73	0-360	299	V
6	9.80901	-69.22	Pk	36.8	-26.2	.7	11.8	-46.12	-13	-33.12	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/836.6MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.67296	-44.15	Pk	29.1	-34.9	.5	11.8	-37.65	-13	-24.65	0-360	101	H
2	2.50942	-41.3	Pk	32.4	-34.3	.4	11.8	-31	-13	-18	0-360	299	H
3	4.18332	-64.23	Pk	33.4	-32.3	.4	11.8	-50.93	-13	-37.93	0-360	101	H
4	1.67296	-43.87	Pk	29.1	-34.9	.5	11.8	-37.37	-13	-24.37	0-360	101	V
5	2.50992	-42.94	Pk	32.4	-34.3	.4	11.8	-32.64	-13	-19.64	0-360	299	V
6	4.18257	-63.75	Pk	33.4	-32.3	.4	11.8	-50.45	-13	-37.45	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/848.8MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.69746	-42.19	Pk	29.5	-34.8	.5	11.8	-35.19	-13	-22.19	0-360	101	H
2	2.54616	-38.71	Pk	32.7	-34.1	.4	11.8	-27.91	-13	-14.91	0-360	101	H
3	4.24332	-62.3	Pk	33.4	-32.2	.4	11.8	-48.9	-13	-35.9	0-360	101	H
4	1.69746	-42.51	Pk	29.5	-34.8	.5	11.8	-35.51	-13	-22.51	0-360	101	V
5	2.54641	-40.12	Pk	32.7	-34.1	.4	11.8	-29.32	-13	-16.32	0-360	300	V
6	4.24332	-64.97	Pk	33.4	-32.2	.4	11.8	-51.57	-13	-38.57	0-360	300	V
7	6.56019	-66.97	Pk	35.6	-29.4	.6	11.8	-48.37	-13	-35.37	0-360	101	V

Pk - Peak detector

EGPRS Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/824.2MHz
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.64846	-51.9	Pk	28.7	-34.8	.5	11.8	-45.7	-13	-32.7	0-360	199	H
2	2.47242	-59.42	Pk	32.5	-34.2	.4	11.8	-48.92	-13	-35.92	0-360	199	H
3	7.05866	-68.36	Pk	35.7	-28.4	.8	11.8	-48.46	-13	-35.46	0-360	101	H
4	1.64846	-53.78	Pk	28.7	-34.8	.5	11.8	-47.58	-13	-34.58	0-360	101	V
5	2.47242	-55.2	Pk	32.5	-34.2	.4	11.8	-44.7	-13	-31.7	0-360	200	V
6	3.35537	-63.21	Pk	32.9	-33.3	.5	11.8	-51.31	-13	-38.31	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/836.6MHz
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.67346	-49.18	Pk	29.1	-34.9	.5	11.8	-42.68	-13	-29.68	0-360	101	H
2	2.44442	-58.27	Pk	32.5	-34.3	.4	11.8	-47.87	-13	-34.87	0-360	299	H
3	2.50992	-52.7	Pk	32.4	-34.3	.4	11.8	-42.4	-13	-29.4	0-360	101	H
4	1.67296	-58.1	Pk	29.1	-34.9	.5	11.8	-51.6	-13	-38.6	0-360	299	V
5	2.50942	-51.24	Pk	32.4	-34.3	.4	11.8	-40.94	-13	-27.94	0-360	101	V
6	9.01355	-69.15	Pk	36.2	-27.3	.5	11.8	-47.95	-13	-34.95	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/848.8MHz
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.69746	-53.89	Pk	29.5	-34.8	.5	11.8	-46.89	-13	-33.89	0-360	199	H
4	1.69746	-58.72	Pk	29.5	-34.8	.5	11.8	-51.72	-13	-38.72	0-360	300	V
5	1.88195	-56.23	Pk	31.1	-34.6	.4	11.8	-47.53	-13	-34.53	0-360	200	V
2	2.54591	-51.43	Pk	32.7	-34.1	.4	11.8	-40.63	-13	-27.63	0-360	199	H
6	2.54641	-50.64	Pk	32.7	-34.1	.4	11.8	-39.84	-13	-26.84	0-360	200	V
3	7.22965	-68.38	Pk	35.6	-28.1	.7	11.8	-48.38	-13	-35.38	0-360	300	H

Pk - Peak detector

9.2.2. GSM 1900

GPRS Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/1850.2MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	7.20586	-68.67	Pk	35.6	-27.9	11.8	-49.17	-13	-36.17	0-360	200	H
2	9.28429	-69.3	Pk	36.3	-26.7	11.8	-47.9	-13	-34.9	0-360	101	H
3	17.50251	-70.78	Pk	41	-23.2	11.8	-41.18	-13	-28.18	0-360	200	H
4	6.89337	-68.11	Pk	35.7	-28.5	11.8	-49.11	-13	-36.11	0-360	299	V
5	11.05023	-71.44	Pk	38.1	-24	11.8	-45.54	-13	-32.54	0-360	200	V
6	12.65117	-70.46	Pk	39.2	-24.5	11.8	-43.96	-13	-30.96	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/1800.0MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	6.39288	-68.64	Pk	35.6	-28.3	11.8	-49.54	-13	-36.54	0-360	300	H
2	9.69577	-70.53	Pk	36.7	-25.8	11.8	-47.83	-13	-34.83	0-360	101	H
3	17.02102	-71.18	Pk	41.9	-23.9	11.8	-41.38	-13	-28.38	0-360	300	H
4	6.36389	-69.01	Pk	35.5	-28	11.8	-49.71	-13	-36.71	0-360	200	V
5	9.48528	-69.99	Pk	36.5	-26.3	11.8	-47.99	-13	-34.99	0-360	200	V
6	17.05452	-71.71	Pk	41.8	-23.6	11.8	-41.71	-13	-28.71	0-360	300	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	GPRS/1909.8MHz
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	6.39388	-68.55	Pk	35.6	-28.3	11.8	-49.45	-13	-36.45	0-360	299	H
2	12.30318	-72.37	Pk	38.9	-23.9	11.8	-45.57	-13	-32.57	0-360	101	H
3	17.02002	-70.76	Pk	41.9	-23.9	11.8	-40.96	-13	-27.96	0-360	299	H
4	4.45995	-64.37	Pk	33.8	-31.9	11.8	-50.67	-13	-37.67	0-360	299	V
5	12.73567	-71.38	Pk	39.2	-24.8	11.8	-45.18	-13	-32.18	0-360	200	V
6	17.08552	-71.6	Pk	41.8	-23.1	11.8	-41.1	-13	-28.1	0-360	200	V

Pk - Peak detector

EGPRS Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/1850.2MHz
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	4.22396	-65.97	Pk	33.4	-31.1	11.8	-51.87	-13	-38.87	0-360	299	H
2	9.08879	-70.19	Pk	36.2	-26.1	11.8	-48.29	-13	-35.29	0-360	299	H
3	16.51804	-71.75	Pk	41.5	-23.2	11.8	-41.65	-13	-28.65	0-360	199	H
4	4.56845	-66	Pk	34	-31.4	11.8	-51.6	-13	-38.6	0-360	101	V
5	6.33689	-68.71	Pk	35.5	-28.1	11.8	-49.51	-13	-36.51	0-360	200	V
6	15.43658	-72.72	Pk	40.3	-22.1	11.8	-42.72	-13	-29.72	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/1880.0MHz
Tested by:	85198/11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.97247	-65.97	Pk	33.4	-31.7	11.8	-52.47	-13	-39.47	0-360	101	H
2	6.26089	-67.51	Pk	35.5	-28.3	11.8	-48.51	-13	-35.51	0-360	299	H
3	10.30525	-71.88	Pk	37.5	-24.4	11.8	-46.98	-13	-33.98	0-360	200	H
4	3.33649	-64.91	Pk	32.9	-32.6	11.8	-52.81	-13	-39.81	0-360	101	V
5	3.77847	-64.83	Pk	33.3	-32.7	11.8	-52.43	-13	-39.43	0-360	200	V
6	17.04202	-70.1	Pk	41.9	-23.7	11.8	-40.1	-13	-27.1	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	EGPRS/1909.9MHz
Tested by:	85198/11993
Date:	2020-11-24

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	4.67944	-66.15	Pk	34.1	-31.6	11.8	-51.85	-13	-38.85	0-360	300	H
2	5.06543	-66.02	Pk	34	-31.1	11.8	-51.32	-13	-38.32	0-360	300	H
3	12.77667	-71.09	Pk	39.2	-24.9	11.8	-44.99	-13	-31.99	0-360	101	H
4	5.13393	-66.2	Pk	34.1	-31.1	11.8	-51.4	-13	-38.4	0-360	300	V
5	7.07236	-68.93	Pk	35.7	-27.8	11.8	-49.23	-13	-36.23	0-360	101	V
6	12.84517	-70.66	Pk	39.2	-24.9	11.8	-44.56	-13	-31.56	0-360	200	V

Pk - Peak detector

9.2.3. WCDMA BAND 5

Rel 99 Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/826.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.65146	-57.73	Pk	28.7	-34.8	.5	11.8	-51.53	-13	-38.53	0-360	199	H
2	2.44392	-59.73	Pk	32.5	-34.3	.4	11.8	-49.33	-13	-36.33	0-360	199	H
3	6.44819	-68.34	Pk	35.6	-29.2	.6	11.8	-49.54	-13	-36.54	0-360	300	H
4	1.65146	-60.65	Pk	28.7	-34.8	.5	11.8	-54.45	-13	-41.45	0-360	101	V
5	2.44642	-55.21	Pk	32.5	-34.3	.4	11.8	-44.81	-13	-31.81	0-360	200	V
6	6.4102	-67.73	Pk	35.6	-29.5	.6	11.8	-49.23	-13	-36.23	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/836.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.67446	-57.55	Pk	29.1	-34.9	.5	11.8	-51.05	-13	-38.05	0-360	101	H
2	2.56241	-63.89	Pk	32.6	-34.3	.4	11.8	-53.39	-13	-40.39	0-360	101	H
3	6.4052	-67.77	Pk	35.6	-29.5	.6	11.8	-49.27	-13	-36.27	0-360	200	H
4	1.67496	-60.75	Pk	29.1	-34.9	.5	11.8	-54.25	-13	-41.25	0-360	300	V
5	2.43842	-63.02	Pk	32.4	-34.3	.4	11.8	-52.72	-13	-39.72	0-360	300	V
6	9.71551	-70.21	Pk	36.7	-26.3	.7	11.8	-47.31	-13	-34.31	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/846.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.69396	-61.79	Pk	29.4	-34.8	.5	11.8	-54.89	-13	-41.89	0-360	101	H
2	2.54291	-60.34	Pk	32.6	-34.1	.4	11.8	-49.64	-13	-36.64	0-360	101	H
3	9.35603	-70.27	Pk	36.4	-26.7	.6	11.8	-48.17	-13	-35.17	0-360	101	H
4	1.69196	-62.88	Pk	29.4	-34.8	.5	11.8	-55.98	-13	-42.98	0-360	101	V
5	2.53691	-64.4	Pk	32.6	-34.2	.4	11.8	-53.8	-13	-40.8	0-360	101	V
6	9.32903	-70.49	Pk	36.3	-26.7	.7	11.8	-48.39	-13	-35.39	0-360	300	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/826.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.65096	-58.5	Pk	28.7	-34.8	.5	11.8	-52.3	-13	-39.3	0-360	299	H
2	2.47942	-55.51	Pk	32.4	-34.2	.4	11.8	-45.11	-13	-32.11	0-360	101	H
3	7.99461	-69.2	Pk	35.8	-27.7	.4	11.8	-48.9	-13	-35.9	0-360	101	H
4	1.65096	-62.24	Pk	28.7	-34.8	.5	11.8	-56.04	-13	-43.04	0-360	101	V
5	2.48192	-56.37	Pk	32.4	-34.2	.4	11.8	-45.97	-13	-32.97	0-360	101	V
6	9.42353	-69.78	Pk	36.4	-26.9	.6	11.8	-47.88	-13	-34.88	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/836.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.67546	-58.75	Pk	29.1	-34.9	.5	11.8	-52.25	-13	-39.25	0-360	300	H
2	2.50892	-55.86	Pk	32.4	-34.3	.4	11.8	-45.56	-13	-32.56	0-360	101	H
3	9.841	-70.91	Pk	36.9	-26	.7	11.8	-47.51	-13	-34.51	0-360	101	H
4	1.67546	-62.54	Pk	29.1	-34.9	.5	11.8	-56.04	-13	-43.04	0-360	101	V
5	2.51342	-56.9	Pk	32.5	-34.1	.4	11.8	-46.3	-13	-33.3	0-360	101	V
6	7.05916	-69.12	Pk	35.7	-28.4	.8	11.8	-49.22	-13	-36.22	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/846.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.69546	-61.64	Pk	29.5	-34.8	.5	11.8	-54.64	-13	-41.64	0-360	200	H
2	2.53991	-54.22	Pk	32.6	-34.1	.4	11.8	-43.52	-13	-30.52	0-360	101	H
3	8.0716	-69.06	Pk	35.8	-27.6	.4	11.8	-48.66	-13	-35.66	0-360	299	H
4	1.69496	-63.35	Pk	29.5	-34.8	.5	11.8	-56.35	-13	-43.35	0-360	299	V
5	2.54341	-55.3	Pk	32.6	-34.1	.4	11.8	-44.6	-13	-31.6	0-360	101	V
6	8.1796	-69.35	Pk	35.8	-27.7	.4	11.8	-49.05	-13	-36.05	0-360	200	V

Pk - Peak detector

9.2.4. WCDMA BAND 2

Rel 99 Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1852.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.56091	-65.19	Pk	34.4	-30.6	11.8	-49.59	-13	-36.59	0-360	101	H
2	10.31375	-71.43	Pk	37.5	-24.4	11.8	-46.53	-13	-33.53	0-360	101	H
3	16.91503	-71.45	Pk	42	-23.4	11.8	-41.05	-13	-28.05	0-360	101	H
4	5.55941	-63.49	Pk	34.4	-30.6	11.8	-47.89	-13	-34.89	0-360	299	V
5	10.52224	-71.08	Pk	37.8	-24.9	11.8	-46.38	-13	-33.38	0-360	299	V
6	16.79553	-71.91	Pk	41.9	-24	11.8	-42.21	-13	-29.21	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1880.0MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.75847	-61.76	Pk	33.2	-32.7	11.8	-49.46	-13	-36.46	0-360	101	H
2	5.63791	-64.87	Pk	34.5	-29.4	11.8	-47.97	-13	-34.97	0-360	101	H
3	16.98102	-71.19	Pk	42	-24.1	11.8	-41.49	-13	-28.49	0-360	200	H
4	3.76197	-62.01	Pk	33.2	-32.8	11.8	-49.81	-13	-36.81	0-360	101	V
5	5.63841	-67.37	Pk	34.5	-29.4	11.8	-50.47	-13	-37.47	0-360	300	V
6	16.99952	-71.74	Pk	41.9	-24	11.8	-42.04	-13	-29.04	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1907.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.81797	-65.08	Pk	33.3	-32.3	11.8	-52.28	-13	-39.28	0-360	299	H
2	10.27875	-70.79	Pk	37.5	-24.6	11.8	-46.09	-13	-33.09	0-360	299	H
3	17.02452	-71.42	Pk	41.9	-23.9	11.8	-41.62	-13	-28.62	0-360	299	H
4	3.81747	-64.16	Pk	33.3	-32.3	11.8	-51.36	-13	-38.36	0-360	101	V
5	5.71891	-66.47	Pk	34.6	-29.5	11.8	-49.57	-13	-36.57	0-360	101	V
6	17.02652	-71.41	Pk	41.9	-23.9	11.8	-41.61	-13	-28.61	0-360	299	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1852.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.70298	-63.41	Pk	33.1	-32.5	11.8	-51.01	-13	-38.01	0-360	200	H
2	11.27622	-72.38	Pk	38.1	-23.3	11.8	-45.78	-13	-32.78	0-360	200	H
3	16.97252	-71.3	Pk	42	-24.1	11.8	-41.6	-13	-28.6	0-360	300	H
4	3.70598	-61.58	Pk	33.1	-32.5	11.8	-49.18	-13	-36.18	0-360	101	V
5	10.30325	-71.76	Pk	37.5	-24.4	11.8	-46.86	-13	-33.86	0-360	200	V
6	16.98102	-70.89	Pk	42	-24.1	11.8	-41.19	-13	-28.19	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1880.0MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.75747	-63.27	Pk	33.2	-32.7	11.8	-50.97	-13	-37.97	0-360	101	H
2	6.34139	-68.39	Pk	35.5	-28.2	11.8	-49.29	-13	-36.29	0-360	101	H
3	17.822	-72.38	Pk	41.1	-21.7	11.8	-41.18	-13	-28.18	0-360	101	H
4	3.75797	-62.6	Pk	33.2	-32.7	11.8	-50.3	-13	-37.3	0-360	101	V
5	6.39438	-68.16	Pk	35.6	-28.4	11.8	-49.16	-13	-36.16	0-360	299	V
6	16.84103	-71.53	Pk	41.9	-23.4	11.8	-41.23	-13	-28.23	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1907.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	6.11339	-68.5	Pk	35.4	-29	11.8	-50.3	-13	-37.3	0-360	299	H
2	10.35325	-71.34	Pk	37.6	-24.6	11.8	-46.54	-13	-33.54	0-360	101	H
3	16.98002	-71.06	Pk	42	-24.1	11.8	-41.36	-13	-28.36	0-360	101	H
4	8.43232	-69.41	Pk	35.9	-27.2	11.8	-48.91	-13	-35.91	0-360	299	V
5	12.29018	-72.09	Pk	38.9	-24	11.8	-45.39	-13	-32.39	0-360	101	V
6	16.96353	-70.89	Pk	42	-24	11.8	-41.09	-13	-28.09	0-360	200	V

Pk - Peak detector

9.2.5. WCDMA BAND 4

Rel 99 Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA4/1712.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.13993	-65.19	Pk	34.1	-31.1	11.8	-50.39	-13	-37.39	0-360	101	H
2	12.28368	-71.45	Pk	38.8	-24	11.8	-44.85	-13	-31.85	0-360	299	H
3	17.00552	-71.18	Pk	41.9	-24.1	11.8	-41.58	-13	-28.58	0-360	101	H
4	5.13593	-64.04	Pk	34.1	-31.1	11.8	-49.24	-13	-36.24	0-360	101	V
5	12.25919	-71.36	Pk	38.8	-24.2	11.8	-44.96	-13	-31.96	0-360	101	V
6	17.02352	-72.07	Pk	41.9	-23.9	11.8	-42.27	-13	-29.27	0-360	299	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA4/1732.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.19493	-63.91	Pk	34.2	-31.1	11.8	-49.01	-13	-36.01	0-360	101	H
2	6.92487	-67.07	Pk	35.7	-28.1	11.8	-47.67	-13	-34.67	0-360	101	H
3	12.37718	-70.84	Pk	38.9	-24.1	11.8	-44.24	-13	-31.24	0-360	101	H
4	5.19993	-62.07	Pk	34.3	-31.1	11.8	-47.07	-13	-34.07	0-360	101	V
5	7.28935	-69.39	Pk	35.6	-27.6	11.8	-49.59	-13	-36.59	0-360	200	V
6	15.40258	-73.37	Pk	40.3	-22	11.8	-43.27	-13	-30.27	0-360	300	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA4/1752.5MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-04

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.25342	-66.07	Pk	34.4	-30.1	11.8	-49.97	-13	-36.97	0-360	101	H
2	7.01486	-67.71	Pk	35.7	-27.5	11.8	-47.71	-13	-34.71	0-360	101	H
3	12.23919	-71.16	Pk	38.8	-24.2	11.8	-44.76	-13	-31.76	0-360	300	H
4	5.26092	-63.03	Pk	34.4	-29.9	11.8	-46.73	-13	-33.73	0-360	101	V
5	7.01536	-69.38	Pk	35.7	-27.5	11.8	-49.38	-13	-36.38	0-360	200	V
6	16.85003	-72.18	Pk	41.9	-23.4	11.8	-41.88	-13	-28.88	0-360	101	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA4/1712.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	6.41388	-68.99	Pk	35.6	-28.4	11.8	-49.99	-13	-36.99	0-360	101	H
2	12.25319	-72.73	Pk	38.8	-24.3	11.8	-46.43	-13	-33.43	0-360	200	H
3	17.03152	-71.87	Pk	41.9	-23.9	11.8	-42.07	-13	-29.07	0-360	300	H
4	6.33239	-69.41	Pk	35.5	-28	11.8	-50.11	-13	-37.11	0-360	200	V
5	12.27018	-72.29	Pk	38.8	-24.1	11.8	-45.79	-13	-32.79	0-360	200	V
6	17.04352	-71.82	Pk	41.9	-23.7	11.8	-41.82	-13	-28.82	0-360	300	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1732.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.19393	-64.82	Pk	34.2	-31.1	11.8	-49.92	-13	-36.92	0-360	101	H
2	6.93337	-68.87	Pk	35.7	-28	11.8	-49.37	-13	-36.37	0-360	101	H
3	16.98852	-71.15	Pk	41.9	-24.1	11.8	-41.55	-13	-28.55	0-360	300	H
4	5.19943	-64.98	Pk	34.3	-31.1	11.8	-49.98	-13	-36.98	0-360	101	V
5	8.66681	-69.57	Pk	36	-27.1	11.8	-48.87	-13	-35.87	0-360	200	V
6	17.41851	-71.55	Pk	41.1	-23.2	11.8	-41.85	-13	-28.85	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA4/1752.5MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-05

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.26042	-65.89	Pk	34.4	-29.9	11.8	-49.59	-13	-36.59	0-360	101	H
2	12.67067	-71.54	Pk	39.2	-24.4	11.8	-44.94	-13	-31.94	0-360	200	H
3	16.96453	-71.72	Pk	42	-24	11.8	-41.92	-13	-28.92	0-360	101	H
4	5.25392	-66.08	Pk	34.4	-30.1	11.8	-49.98	-13	-36.98	0-360	101	V
5	10.23675	-70.86	Pk	37.4	-25	11.8	-46.66	-13	-33.66	0-360	300	V
6	13.43965	-71	Pk	38.7	-23.9	11.8	-44.4	-13	-31.4	0-360	101	V

Pk - Peak detector

9.3. FIELD STRENGTH OF SPURIOUS RADIATION BELOW 1GHz

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

LIMITS

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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

KDB 971168 D01 v02r02/D02 v01

All tests below 1GHz were done with a Resolution Bandwidth of 100kHz and a Video Bandwidth of 300kHz

RESULTS

9.3.1. GSM 850

GPRS MODE

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/824.2MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	46.3	-72.8	Pk	15.6	-31.2	.1	9.7	-78.6	-13	-65.6	0-360	399	H
4	46.5	-62.13	Pk	15.5	-31.2	.1	9.7	-68.03	-13	-55.03	0-360	101	V
5	59.45	-64.19	Pk	13.5	-31	.2	9.7	-71.79	-13	-58.79	0-360	101	V
2	106.4	-68.61	Pk	18	-30.4	.3	9.7	-71.01	-13	-58.01	0-360	300	H
3	478.75	-77.43	Pk	23.8	-27.4	.6	9.7	-70.73	-13	-57.73	0-360	200	H
6	565.6	-78.42	Pk	24.5	-27	.8	9.7	-70.42	-13	-57.42	0-360	99	V

Pk - Peak detector

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/836.6 MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.6	-73.78	Pk	15.9	-31.2	.1	9.7	-79.28	-13	-66.28	0-360	299	H
4	46.95	-63.27	Pk	15.2	-31.2	.1	9.7	-69.47	-13	-56.47	0-360	100	V
5	103.95	-65.07	Pk	17.5	-30.4	.3	9.7	-67.97	-13	-54.97	0-360	100	V
2	105.85	-69.89	Pk	17.9	-30.4	.3	9.7	-72.39	-13	-59.39	0-360	299	H
3	470.6	-76.04	Pk	23.5	-27.5	.6	9.7	-69.74	-13	-56.74	0-360	200	H
6	498.55	-78.29	Pk	23.8	-27.2	.7	9.7	-71.29	-13	-58.29	0-360	200	V

Pk - Peak detector

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/848.8 MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.95	-72.4	Pk	15.7	-31.2	.1	9.7	-78.1	-13	-65.1	0-360	400	H
4	46.35	-61.48	Pk	15.5	-31.2	.1	9.7	-67.38	-13	-54.38	0-360	101	V
5	104.5	-66.64	Pk	17.6	-30.4	.3	9.7	-69.44	-13	-56.44	0-360	101	V
2	107	-68.93	Pk	18.1	-30.4	.3	9.7	-71.23	-13	-58.23	0-360	299	H
3	499.45	-78.58	Pk	23.8	-27.2	.7	9.7	-71.58	-13	-58.58	0-360	199	H
6	570.8	-78.3	Pk	24.6	-27.1	.8	9.7	-70.3	-13	-57.3	0-360	200	V

Pk - Peak detector

EGPRS MODE

Project Number	13548896
Client	Lions
Test Location	N-SAC
Mode	EGPRS/824.2MHz
Tested by	19289 / 11993
DATE	2020/11/24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.85	-69.57	Pk	13.6	-30.9	.2	9.7	-76.97	-13	-63.97	0-360	300	H
4	61.25	-65.62	Pk	13.6	-31	.2	9.7	-73.12	-13	-60.12	0-360	100	V
5	78	-64.99	Pk	13.8	-30.7	.2	9.7	-71.99	-13	-58.99	0-360	100	V
2	108.05	-71.66	Pk	18.3	-30.4	.3	9.7	-73.76	-13	-60.76	0-360	300	H
6	108.3	-65.25	Pk	18.4	-30.3	.3	9.7	-67.15	-13	-54.15	0-360	100	V
3	182	-72.47	Pk	17.4	-29.5	.5	9.7	-74.37	-13	-61.37	0-360	200	H

Pk - Peak detector

Project Number	13548896
Client	Lions
Test Location	N-SAC
Mode	EGPRS/836.6MHz
Tested by	19289 / 11993
Date	2020/11/24

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.75	-69.63	Pk	13.6	-30.9	.2	9.7	-77.03	-13	-64.03	0-360	399	H
4	61.25	-65.93	Pk	13.6	-31	.2	9.7	-73.43	-13	-60.43	0-360	101	V
5	78	-65.31	Pk	13.8	-30.7	.2	9.7	-72.31	-13	-59.31	0-360	101	V
6	108.7	-65.87	Pk	18.4	-30.3	.3	9.7	-67.77	-13	-54.77	0-360	101	V
2	108.85	-71.75	Pk	18.5	-30.3	.3	9.7	-73.55	-13	-60.55	0-360	299	H
3	182	-73.41	Pk	17.4	-29.5	.5	9.7	-75.31	-13	-62.31	0-360	199	H

Pk - Peak detector

Project Number	13548896
Client	Lions
Test Location	N-SAC
Mode	EGPRS/848.8MHz
Tested by	19289 / 11993
Date	2020/11/24

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.05	-69.19	Pk	13.6	-30.9	.2	9.7	-76.59	-13	-63.59	0-360	300	H
4	61.15	-65.67	Pk	13.6	-31	.2	9.7	-73.17	-13	-60.17	0-360	100	V
5	78	-64.88	Pk	13.8	-30.7	.2	9.7	-71.88	-13	-58.88	0-360	100	V
6	107.9	-65.15	Pk	18.3	-30.4	.3	9.7	-67.25	-13	-54.25	0-360	100	V
2	108.55	-72.85	Pk	18.4	-30.3	.3	9.7	-74.75	-13	-61.75	0-360	300	H
3	181.95	-73.47	Pk	17.4	-29.5	.5	9.7	-75.37	-13	-62.37	0-360	200	H

Pk - Peak detector

9.3.2. GSM 1900

GPRS MODE

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/1850.2 MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	46.1	-72.37	Pk	15.7	-31.2	.1	9.7	-78.07	-13	-65.07	0-360	299	H
4	46.2	-62.6	Pk	15.6	-31.2	.1	9.7	-68.4	-13	-55.4	0-360	100	V
5	105.2	-67.38	Pk	17.7	-30.4	.2	9.7	-70.18	-13	-57.18	0-360	100	V
2	106.25	-68.83	Pk	18	-30.4	.2	9.7	-71.33	-13	-58.33	0-360	299	H
3	483.5	-74	Pk	23.8	-27.5	.4	9.7	-67.6	-13	-54.6	0-360	199	H
6	639.95	-77.79	Pk	25.9	-26.7	.5	9.7	-68.39	-13	-55.39	0-360	299	V

Pk - Peak detector

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/1880.0 MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.95	-73.58	Pk	15.7	-31.2	.1	9.7	-79.28	-13	-66.28	0-360	399	H
4	46	-62.9	Pk	15.7	-31.2	.1	9.7	-68.6	-13	-55.6	0-360	101	V
5	105.45	-69.45	Pk	17.8	-30.4	.2	9.7	-72.15	-13	-59.15	0-360	101	V
2	105.95	-67.95	Pk	17.9	-30.4	.2	9.7	-70.55	-13	-57.55	0-360	300	H
3	481.7	-77.79	Pk	23.8	-27.4	.4	9.7	-71.29	-13	-58.29	0-360	200	H
6	950.5	-79.5	Pk	29.2	-24.2	.7	9.7	-64.1	-13	-51.1	0-360	299	V

Pk - Peak detector

Project Number	13548896
Client	Samsung
Test Location	N-SAC
Mode	GPRS/1909.8 MHz
Tested by	19289 / 11993
Date	2020-11-20

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	46.2	-62.28	Pk	15.6	-31.2	.1	9.7	-68.08	-13	-55.08	0-360	100	V
1	46.6	-72.99	Pk	15.4	-31.2	.1	9.7	-78.99	-13	-65.99	0-360	399	H
5	105.9	-67.18	Pk	17.9	-30.4	.2	9.7	-69.78	-13	-56.78	0-360	100	V
2	106.2	-69.17	Pk	17.9	-30.4	.2	9.7	-71.77	-13	-58.77	0-360	300	H
3	488.65	-76.99	Pk	23.8	-27.2	.4	9.7	-70.29	-13	-57.29	0-360	99	H
6	735.4	-78.47	Pk	26.7	-26.2	.6	9.7	-67.67	-13	-54.67	0-360	299	V

Pk - Peak detector

EGPRS MODE

Project Number	13548896
Client	Lions
Test Location	N-SAC
Mode	EGPRS/1850.2MHz
Tested by	19289 / 11993
Date	2020/11/24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.2	-69.24	Pk	13.6	-30.9	.1	9.7	-76.74	-13	-63.74	0-360	400	H
3	61.55	-66.07	Pk	13.7	-30.9	.1	9.7	-73.47	-13	-60.47	0-360	100	V
4	78	-68.7	Pk	13.8	-30.7	.2	9.7	-75.7	-13	-62.7	0-360	100	V
5	87.95	-69.17	Pk	13.5	-30.5	.2	9.7	-76.27	-13	-63.27	0-360	100	V
2	109.2	-70.99	Pk	18.5	-30.2	.2	9.7	-72.79	-13	-59.79	0-360	400	H
6	109.2	-65.35	Pk	18.5	-30.2	.2	9.7	-67.15	-13	-54.15	0-360	100	V

Pk - Peak detector

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	EGPRS/1800.0MHz
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.8	-77.7	Pk	25.9	-31.5	.1	9.7	-73.5	-13	-60.5	0-360	400	H
2	86.05	-69.41	Pk	13.6	-30.7	.2	9.7	-76.61	-13	-63.61	0-360	400	H
3	96.1	-70.16	Pk	16	-30.6	.2	9.7	-74.86	-13	-61.86	0-360	299	H
4	61.4	-66.75	Pk	13.8	-31	.1	9.7	-74.15	-13	-61.15	0-360	101	V
5	96.05	-69.14	Pk	16	-30.6	.2	9.7	-73.84	-13	-60.84	0-360	101	V
6	157.2	-73.52	Pk	18.7	-30	.3	9.7	-74.82	-13	-61.82	0-360	101	V

Pk - Peak detector

Project Number	13548896
Client	Lions
Test Location	N-SAC
Mode	EGPRS/1909.8MHz
Tested by	19289 / 11993
Date	2020/11/24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.85	-69.24	Pk	13.6	-30.9	.1	9.7	-76.74	-13	-63.74	0-360	399	H
4	61.15	-65.6	Pk	13.6	-30.9	.1	9.7	-73.1	-13	-60.1	0-360	100	V
5	78	-67.85	Pk	13.8	-30.7	.2	9.7	-74.85	-13	-61.85	0-360	100	V
2	84.85	-73.39	Pk	13.3	-30.5	.2	9.7	-80.69	-13	-67.69	0-360	200	H
6	108.8	-66.04	Pk	18.5	-30.2	.2	9.7	-67.84	-13	-54.84	0-360	100	V
3	109.75	-69.43	Pk	18.7	-30.2	.2	9.7	-71.03	-13	-58.03	0-360	299	H

Pk - Peak detector

9.3.3. WCDMA BAND 5

Rel 99 Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/826.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.8	-70.53	Pk	13.8	-31	.2	9.7	-77.83	-13	-64.83	0-360	399	H
2	96.1	-65.03	Pk	16	-30.6	.3	9.7	-69.63	-13	-56.63	0-360	300	H
3	478.4	-77.25	Pk	23.8	-27.9	.6	9.7	-71.05	-13	-58.05	0-360	200	H
4	62.2	-66.98	Pk	13.9	-31	.2	9.7	-74.18	-13	-61.18	0-360	101	V
5	96.05	-62.25	Pk	16	-30.6	.3	9.7	-66.85	-13	-53.85	0-360	101	V
6	553.55	-77.57	Pk	24.4	-27.7	.7	9.7	-70.47	-13	-57.47	0-360	200	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/836.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.2	-68.93	Pk	13.8	-31	.2	9.7	-76.23	-13	-63.23	0-360	400	H
2	96.05	-66.33	Pk	16	-30.6	.3	9.7	-70.93	-13	-57.93	0-360	299	H
3	350.85	-75.85	Pk	20.6	-28.5	.4	9.7	-73.65	-13	-60.65	0-360	101	H
4	30.45	-72.32	Pk	26.7	-31.5	.1	9.7	-67.32	-13	-54.32	0-360	101	V
5	61.55	-65.28	Pk	13.9	-31	.2	9.7	-72.48	-13	-59.48	0-360	101	V
6	96.1	-63.48	Pk	16	-30.6	.3	9.7	-68.08	-13	-55.08	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/846.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	30.2	-72.47	Pk	26.8	-31.5	.1	9.7	-67.37	-13	-54.37	0-360	101	V
1	30.8	-76.56	Pk	26.6	-31.5	.1	9.7	-71.66	-13	-58.66	0-360	99	H
2	61.8	-69.82	Pk	13.9	-31	.2	9.7	-77.02	-13	-64.02	0-360	400	H
5	62.5	-66.6	Pk	13.9	-31	.2	9.7	-73.8	-13	-60.8	0-360	101	V
3	96.15	-66.72	Pk	16	-30.6	.3	9.7	-71.32	-13	-58.32	0-360	299	H
6	96.15	-65.08	Pk	16	-30.6	.3	9.7	-69.68	-13	-56.68	0-360	101	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/826.5MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	58.8	-69.99	Pk	13.6	-31.1	.2	9.7	-77.59	-13	-64.59	0-360	399	H
2	96.1	-65.79	Pk	16	-30.6	.3	9.7	-70.39	-13	-57.39	0-360	299	H
3	559	-77.5	Pk	24.4	-27.6	.8	9.7	-70.2	-13	-57.2	0-360	199	H
4	30.3	-73.58	Pk	26.8	-31.5	.1	9.7	-68.48	-13	-55.48	0-360	101	V
5	62.6	-67.02	Pk	13.9	-31	.2	9.7	-74.22	-13	-61.22	0-360	101	V
6	96.1	-62.83	Pk	16	-30.6	.3	9.7	-67.43	-13	-54.43	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/836.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	59.85	-70.44	Pk	13.7	-31.1	.2	9.7	-77.94	-13	-64.94	0-360	400	H
2	96.1	-66.36	Pk	16	-30.6	.3	9.7	-70.96	-13	-57.96	0-360	300	H
3	457.95	-77.52	Pk	23.1	-27.9	.6	9.7	-72.02	-13	-59.02	0-360	199	H
4	30.05	-74.36	Pk	26.9	-31.5	.1	9.7	-69.16	-13	-56.16	0-360	101	V
5	61.8	-66.74	Pk	13.9	-31	.2	9.7	-73.94	-13	-60.94	0-360	101	V
6	96.1	-63.38	Pk	16	-30.6	.3	9.7	-67.98	-13	-54.98	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA5/846.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.45	-69.85	Pk	13.8	-31	.2	9.7	-77.15	-13	-64.15	0-360	299	H
2	96.1	-65.78	Pk	16	-30.6	.3	9.7	-70.38	-13	-57.38	0-360	299	H
3	512.1	-77.1	Pk	23.7	-27.6	.7	9.7	-70.6	-13	-57.6	0-360	200	H
4	30.05	-72.21	Pk	26.9	-31.5	.1	9.7	-67.01	-13	-54.01	0-360	101	V
5	61.85	-67.33	Pk	13.9	-31	.2	9.7	-74.53	-13	-61.53	0-360	101	V
6	96.1	-63.96	Pk	16	-30.6	.3	9.7	-68.56	-13	-55.56	0-360	101	V

Pk - Peak detector

9.3.4. WCDMA BAND 2

Rel 99 Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1907.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.55	-70.54	Pk	13.9	-31	.1	9.7	-77.84	-13	-64.84	0-360	399	H
2	96.1	-66	Pk	16	-30.6	.2	9.7	-70.7	-13	-57.7	0-360	299	H
3	796.75	-76.53	Pk	27.3	-26.6	.5	9.7	-65.63	-13	-52.63	0-360	101	H
4	30.25	-72.02	Pk	26.8	-31.5	.1	9.7	-66.92	-13	-53.92	0-360	101	V
5	62.05	-65.49	Pk	13.9	-31	.1	9.7	-72.79	-13	-59.79	0-360	101	V
6	96.05	-62.3	Pk	16	-30.6	.2	9.7	-67	-13	-54	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1880.0MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	44.2	-62.57	Pk	16.9	-31.3	.1	9.7	-67.17	-13	-54.17	0-360	99	H
2	96.1	-65.23	Pk	16	-30.6	.2	9.7	-69.93	-13	-56.93	0-360	300	H
3	549.1	-75.47	Pk	24.3	-27.6	.5	9.7	-68.57	-13	-55.57	0-360	199	H
4	61.65	-65.22	Pk	13.9	-31	.1	9.7	-72.52	-13	-59.52	0-360	101	V
5	96.05	-62.59	Pk	16	-30.6	.2	9.7	-67.29	-13	-54.29	0-360	101	V
6	207.05	-71.78	Pk	16.7	-29.4	.3	9.7	-74.48	-13	-61.48	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1907.6MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	78	-70.36	Pk	14	-30.8	.2	9.7	-77.26	-13	-64.26	0-360	300	H
2	96.1	-70.3	Pk	16	-30.6	.2	9.7	-75	-13	-62	0-360	300	H
3	937.7	-78.11	Pk	28.9	-25.1	.7	9.7	-63.91	-13	-50.91	0-360	199	H
4	30.1	-73.76	Pk	26.9	-31.5	.1	9.7	-68.56	-13	-55.56	0-360	101	V
5	63	-69.19	Pk	13.9	-31	.1	9.7	-76.49	-13	-63.49	0-360	101	V
6	96.1	-66.78	Pk	16	-30.6	.2	9.7	-71.48	-13	-58.48	0-360	101	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1852.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.5	-70.57	Pk	13.9	-31	.1	9.7	-77.87	-13	-64.87	0-360	399	H
2	96.1	-67.06	Pk	16	-30.6	.2	9.7	-71.76	-13	-58.76	0-360	300	H
3	555.55	-76.59	Pk	24.4	-27.7	.5	9.7	-69.69	-13	-56.69	0-360	200	H
4	30.25	-70.81	Pk	26.8	-31.5	.1	9.7	-65.71	-13	-52.71	0-360	101	V
5	61.6	-64.85	Pk	13.9	-31	.1	9.7	-72.15	-13	-59.15	0-360	101	V
6	96.1	-64.6	Pk	16	-30.6	.2	9.7	-69.3	-13	-56.3	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1800.0MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	62.3	-69.93	Pk	13.9	-31	.1	9.7	-77.23	-13	-64.23	0-360	400	H
2	96.1	-66.89	Pk	16	-30.6	.2	9.7	-71.59	-13	-58.59	0-360	300	H
3	525.7	-76.19	Pk	24	-27.6	.5	9.7	-69.59	-13	-56.59	0-360	199	H
4	30.2	-73.19	Pk	26.8	-31.5	.1	9.7	-68.09	-13	-55.09	0-360	101	V
5	62.15	-65.37	Pk	13.9	-31	.1	9.7	-72.67	-13	-59.67	0-360	101	V
6	96.1	-62.82	Pk	16	-30.6	.2	9.7	-67.52	-13	-54.52	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Samsung
Test Location:	S-SAC
Mode:	WCDMA2/1907.6MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-23

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	61.5	-70.64	Pk	13.9	-31	.1	9.7	-77.94	-13	-64.94	0-360	400	H
2	96.05	-66.52	Pk	16	-30.6	.2	9.7	-71.22	-13	-58.22	0-360	299	H
3	914.7	-77.69	Pk	28.7	-25.4	.6	9.7	-64.09	-13	-51.09	0-360	101	H
4	30.2	-72.7	Pk	26.8	-31.5	.1	9.7	-67.6	-13	-54.6	0-360	101	V
5	61.65	-65.85	Pk	13.9	-31	.1	9.7	-73.15	-13	-60.15	0-360	101	V
6	96.05	-64.18	Pk	16	-30.6	.2	9.7	-68.88	-13	-55.88	0-360	101	V

Pk - Peak detector

9.3.5. WCDMA BAND 4

Rel 99 Mode

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1712.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	54.1	-71.76	Pk	13.5	-31.2	.1	9.7	-79.66	-13	-66.66	0-360	400	H
2	96.1	-70.19	Pk	16	-30.6	.2	9.7	-74.89	-13	-61.89	0-360	299	H
3	739.55	-76.96	Pk	26.8	-26.9	.6	9.7	-66.76	-13	-53.76	0-360	101	H
4	54.9	-69.05	Pk	13.5	-31.2	.1	9.7	-76.95	-13	-63.95	0-360	101	V
5	96.1	-67.94	Pk	16	-30.6	.2	9.7	-72.64	-13	-59.64	0-360	101	V
6	953.25	-77.65	Pk	29	-25	.7	9.7	-63.25	-13	-50.25	0-360	300	V

Pk - Peak detector

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1732.4MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	78	-71.59	Pk	14	-30.8	.2	9.7	-78.49	-13	-65.49	0-360	299	H
2	96.05	-71.07	Pk	16	-30.6	.2	9.7	-75.77	-13	-62.77	0-360	299	H
3	930.05	-77.7	Pk	28.8	-25.2	.6	9.7	-63.8	-13	-50.8	0-360	101	H
4	53.75	-68.76	Pk	13.5	-31.2	.1	9.7	-76.66	-13	-63.66	0-360	101	V
5	74.2	-72.11	Pk	14.3	-30.9	.1	9.7	-78.91	-13	-65.91	0-360	101	V
6	96.1	-68.08	Pk	16	-30.6	.2	9.7	-72.78	-13	-59.78	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1752.5MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	53.55	-71.76	Pk	13.5	-31.2	.1	9.7	-79.66	-13	-66.66	0-360	399	H
2	96.125	-71.16	Pk	16	-30.6	.2	9.7	-75.86	-13	-62.86	0-360	299	H
3	701.1	-77.02	Pk	26.4	-26.9	.6	9.7	-67.22	-13	-54.22	0-360	299	H
4	54.2	-68.45	Pk	13.5	-31.2	.1	9.7	-76.35	-13	-63.35	0-360	101	V
5	96.1	-68.27	Pk	16	-30.6	.2	9.7	-72.97	-13	-59.97	0-360	101	V
6	830.3	-76.88	Pk	27.9	-26.3	.6	9.7	-64.98	-13	-51.98	0-360	101	V

Pk - Peak detector

HSDPA Mode

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1712.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	62.2	-71.26	Pk	13.9	-31	.1	9.7	-78.56	-13	-65.56	0-360	400	H
2	96.1	-71.57	Pk	16	-30.6	.2	9.7	-76.27	-13	-63.27	0-360	299	H
3	348.25	-71.55	Pk	20.5	-28.4	.4	9.7	-69.35	-13	-56.35	0-360	101	H
4	62	-67.32	Pk	13.9	-31	.1	9.7	-74.62	-13	-61.62	0-360	101	V
5	96.15	-68.33	Pk	16	-30.6	.2	9.7	-73.03	-13	-60.03	0-360	101	V
6	778.15	-74.97	Pk	27.2	-26.6	.6	9.7	-64.07	-13	-51.07	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1732.4MHz/5MHz/HSDPA
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	96.15	-70.81	Pk	16	-30.6	.2	9.7	-75.51	-13	-62.51	0-360	299	H
2	347.75	-71.46	Pk	20.5	-28.4	.3	9.7	-69.36	-13	-56.36	0-360	101	H
3	955.5	-78.23	Pk	29	-24.9	.7	9.7	-63.73	-13	-50.73	0-360	299	H
4	62.1	-67.72	Pk	13.9	-31	.1	9.7	-75.02	-13	-62.02	0-360	101	V
5	96.05	-68.06	Pk	16	-30.6	.2	9.7	-72.76	-13	-59.76	0-360	101	V
6	956.6	-78.7	Pk	29	-24.9	.7	9.7	-64.2	-13	-51.2	0-360	101	V

Pk - Peak detector

Project Number:	13548896
Client:	Lions
Test Location:	S-SAC
Mode:	WCDMA4/1752.5MHz/5MHz/REL99
Tested by:	11993
Date:	2020-11-24

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	53.55	-71.76	Pk	13.5	-31.2	.1	9.7	-79.66	-13	-66.66	0-360	399	H
2	96.125	-71.16	Pk	16	-30.6	.2	9.7	-75.86	-13	-62.86	0-360	299	H
3	701.1	-77.02	Pk	26.4	-26.9	.6	9.7	-67.22	-13	-54.22	0-360	299	H
4	54.2	-68.45	Pk	13.5	-31.2	.1	9.7	-76.35	-13	-63.35	0-360	101	V
5	96.1	-68.27	Pk	16	-30.6	.2	9.7	-72.97	-13	-59.97	0-360	101	V
6	830.3	-76.88	Pk	27.9	-26.3	.6	9.7	-64.98	-13	-51.98	0-360	101	V

Pk - Peak detector

END OF REPORT