



TEST REPORT

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Report Number : RA230620-35481E-RF-00A
FCC ID: 2ATZ4-G5AC

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type: Smart phone
Test Model No.: G5
Multiple Model(s) No.: N/A
Trade Mark: UMIDIGI
Date Received: 2023/06/20
Report Date: 2023/07/06

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger Ling

Roger Ling
EMC Engineer

Approved By:

Candy Li

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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FCC -2G,3G,4G

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230620-35481E-RF-00A	Original Report	2023/07/06

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(TX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 41: 2535-2655MHz(TX/RX)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA 850/LTE B5: -1.15dBi WCDMA 1900/PCS1900/LTE B2: 0.91dBi LTE B7: 1.78dBi, LTE B12: -1.92dBi, LTE B41: 1.79dBi (provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5V from adapter
Sample serial number	RE: 2754-1 RF: 2754-2 (Assigned by ATC)
Sample/EUT Status	Good condition
Normal/Extreme Condition	L.V.: Low Voltage 3.5V _{DC} N.V.: Normal Voltage 3.85V _{DC} H.V.: High Voltage 4.4V _{DC}
Adapter 1 information	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5V, 2A
Adapter 2 information	Model: HF-0502000U Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5.0V, 2A

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
KDB 971168 D01: Power Meas License Digital Systems v03r01

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.
Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.6	848.8
PCS1900	0.25	1850.2	1880	1909.8
WCDMA B2	4.2	1852.4	1880	1907.6
WCDMA B5	4.2	826.4	836.6	846.6
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704.0	707.5	711.0
LTE B41	5	2537.5	2595	2652.5
	10	2540	2595	2650
	15	2542.5	2595	2647.5
	20	2545	2595	2645

Equipment Modifications

No modification was made to the EUT.

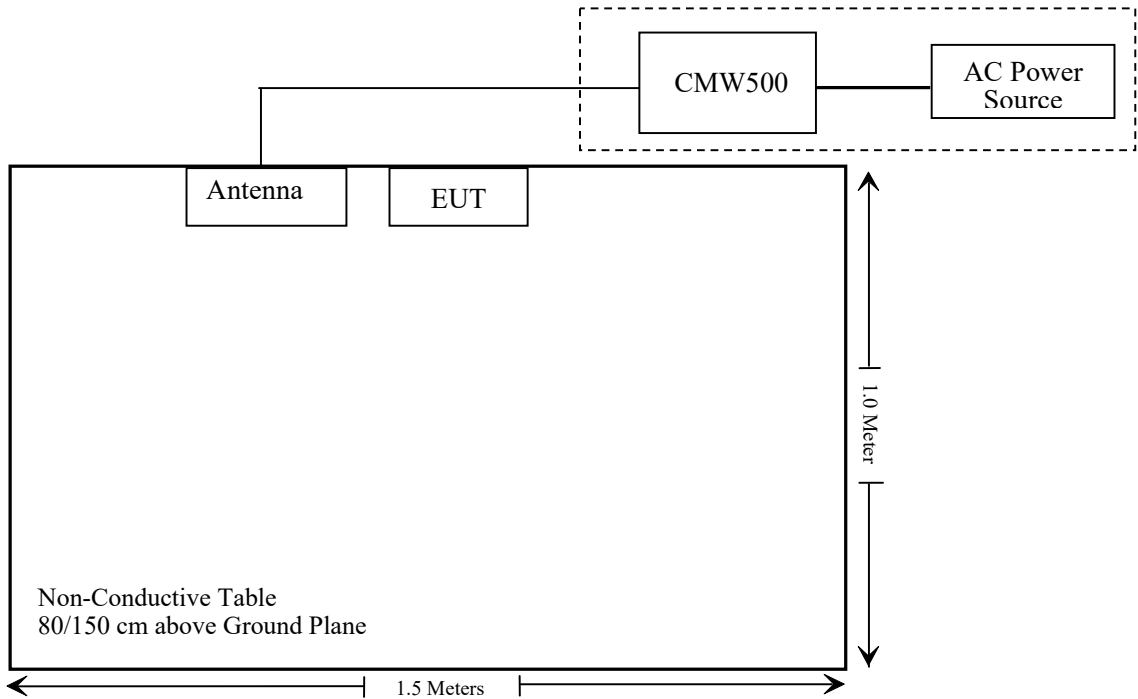
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606

Support Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded Un-detachable AC cable	1.2	AC Power	CMW500

Block Diagram of Test Setup



Note: the support table edge was flush with the center of turntable

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 ,§2.1093	RF Exposure (SAR)	Compliant
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (b) (c) (h);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; §22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (c) (h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF824-862MS-1147	ATCE-141	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF1850-1910MS-1148	ATCE-142	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF2495-2570MS-1152	ATCE-146	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF700-800MS-1153	ATCE-147	2022/11/25	2023/11/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2022/11/30	2025/11/29
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2022/12/26	2025/12/25
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2022/11/30	2025/11/29
PASTERNAK	Horn Antenn	PE9852/2F-20	1120 (ATC-BA-024-1)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenn	PE9852/2F-20	1120 (ATC-BA-025-1)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenn	PE9850/2F-20	720 (ATC-BA-024)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenn	PE9850/2F-20	720 (ATC-BA-025)	2023/01/04	2026/01/03
Unknown	RFCoaxialCable	No.16	N200	2022/11/25	2023/11/24
Agilent	Signal Generator	N5183A	MY51040755	2022/11/25	2023/11/24

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2022/11/25	2023/11/24
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2022/11/25	2023/11/24
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2022/11/25	2023/11/24
REALE	Temp. & Humid. Chamber	RHP-800BT	R20170318310	2022/11/23	2023/11/22
Fluke	Multi Meter	45	7664009	2022/11/23	2023/11/22
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b)&§2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: CR230635481-20A.

FCC§2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046,§ 22.913 (a)&§ 24.232 (c); §27.50 (c)(h)- RF OUTPUT POWER**Applicable Standard**

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

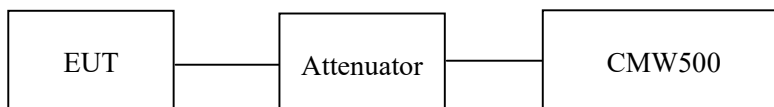
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

Test Procedure

Conducted method: ANSI C63.26-2015 Section 5.2

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.

**Test Data****Environmental Conditions**

Temperature:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-06-26 to 2023-06-28.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	33.2	29.4	38.45
	190	836.6	33.4	29.6	38.45
	251	848.8	33.4	29.6	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.72	31.36	29.42	27.28	28.92	27.56	25.62	23.48	38.45
	190	836.6	32.95	31.26	29.25	27.17	29.15	27.46	25.45	23.37	38.45
	251	848.8	32.96	31.14	29.14	27.00	29.16	27.34	25.34	23.20	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA	RMC12.2k		23.85	23.81	23.77	20.05	20.01	19.97
	HSDPA	1	22.24	22.13	22.17	18.44	18.33	18.37
		2	22.29	22.21	22.21	18.49	18.41	18.41
		3	22.33	22.27	22.25	18.53	18.47	18.45
		4	22.36	22.31	22.28	18.56	18.51	18.48
	HSUPA	1	22.17	22.2	22.13	18.37	18.40	18.33
		2	22.24	22.26	22.16	18.44	18.46	18.36
		3	22.28	22.33	22.22	18.48	18.53	18.42
		4	22.35	22.38	22.27	18.55	18.58	18.47
		5	22.38	22.45	22.29	18.58	18.65	18.49
	HSPA+	1	22.45	22.51	22.32	18.65	18.71	18.52

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd)- Cable Loss

WCDMA Band5: Antenna Gain = -1.15dBi = -3.30dBd (0dBd=2.15dBi)

Cable Loss=0.5dB*(provided by the applicant)

Limit: ERP≤38.45dBm

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	29.7	30.61	33
	661	1880.0	29.6	30.51	33
	810	1909.8	29.4	30.31	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	30.20	27.53	26.26	24.36	31.11	28.44	27.17	25.27	33
	661	1880.0	30.07	27.13	25.94	24.30	30.98	28.04	26.85	25.21	33
	810	1909.8	30.11	26.54	25.36	24.42	31.02	27.45	26.27	25.33	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA	RMC12.2k		20.81	20.89	20.86	21.72	21.80	21.77
	HSDPA	1	20.31	20.24	20.25	21.22	21.15	21.16
		2	20.25	20.19	20.22	21.16	21.10	21.13
		3	20.14	20.09	20.24	21.05	21.00	21.15
		4	20.12	19.86	19.92	21.03	20.77	20.83
	HSUPA	1	20.22	20.12	20.02	21.13	21.03	20.93
		2	20.03	20.08	20.04	20.94	20.99	20.95
		3	20.12	20.03	20.26	21.03	20.94	21.17
		4	20.04	20.17	20.14	20.95	21.08	21.05
		5	20.13	20.24	20.17	21.04	21.15	21.08
	HSPA+	1	20.12	20.14	20.10	21.03	21.05	21.01

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

WCDMA Band2: Antenna Gain = 0.91dBi

Limit: EIRP ≤ 33dBm

LTE Band 2

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	19.53	19.75	19.92	20.44	20.66	20.83
		RB1#3	19.48	19.78	19.88	20.39	20.69	20.79
		RB1#5	19.55	19.71	19.96	20.46	20.62	20.87
		RB3#0	19.74	19.57	19.93	20.65	20.48	20.84
		RB3#3	19.73	19.67	19.81	20.64	20.58	20.72
		RB6#0	18.72	18.62	18.84	19.63	19.53	19.75
	16QAM	RB1#0	18.43	19.03	19.61	19.34	19.94	20.52
		RB1#3	18.47	18.93	19.61	19.38	19.84	20.52
		RB1#5	18.43	19.06	19.68	19.34	19.97	20.59
		RB3#0	18.83	18.60	19.03	19.74	19.51	19.94
		RB3#3	18.83	18.56	19.04	19.74	19.47	19.95
		RB6#0	17.94	17.62	18.07	18.85	18.53	18.98
3.0	QPSK	RB1#0	19.67	19.49	19.66	20.58	20.40	20.57
		RB1#8	19.64	19.49	19.72	20.55	20.40	20.63
		RB1#14	19.74	19.57	19.69	20.65	20.48	20.60
		RB6#0	18.70	18.59	18.77	19.61	19.50	19.68
		RB6#9	18.78	18.63	18.83	19.69	19.54	19.74
		RB15#0	18.78	18.71	18.80	19.69	19.62	19.71
	16QAM	RB1#0	19.42	18.29	19.01	20.33	19.20	19.92
		RB1#8	19.44	18.30	19.04	20.35	19.21	19.95
		RB1#14	19.44	18.31	19.06	20.35	19.22	19.97
		RB6#0	17.83	17.57	18.01	18.74	18.48	18.92
		RB6#9	17.87	17.59	18.06	18.78	18.50	18.97
		RB15#0	17.73	17.74	17.97	18.64	18.65	18.88

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	19.75	19.49	19.59	20.66	20.40	20.50
		RB1#13	19.75	19.51	19.63	20.66	20.42	20.54
		RB1#24	19.78	19.51	19.71	20.69	20.42	20.62
		RB15#0	18.70	18.56	18.79	19.61	19.47	19.70
		RB15#10	18.66	18.70	18.83	19.57	19.61	19.74
		RB25#0	18.60	18.59	18.74	19.51	19.50	19.65
	16QAM	RB1#0	18.83	18.67	17.94	19.74	19.58	18.85
		RB1#13	18.84	18.64	17.99	19.75	19.55	18.90
		RB1#24	18.87	18.68	18.00	19.78	19.59	18.91
		RB15#0	17.60	17.60	17.95	18.51	18.51	18.86
		RB15#10	17.70	17.62	17.96	18.61	18.53	18.87
		RB25#0	17.80	17.79	17.94	18.71	18.70	18.85
10.0	QPSK	RB1#0	19.74	19.58	19.62	20.65	20.49	20.53
		RB1#25	19.78	19.40	19.68	20.69	20.31	20.59
		RB1#49	19.78	19.56	19.83	20.69	20.47	20.74
		RB25#0	18.72	18.68	18.64	19.63	19.59	19.55
		RB25#25	18.65	18.59	18.77	19.56	19.50	19.68
		RB50#0	18.68	18.65	18.76	19.59	19.56	19.67
	16QAM	RB1#0	18.82	18.39	19.06	19.73	19.30	19.97
		RB1#25	18.80	18.35	19.23	19.71	19.26	20.14
		RB1#49	18.79	18.35	19.28	19.70	19.26	20.19
		RB25#0	17.82	17.87	17.79	18.73	18.78	18.70
		RB25#25	17.84	17.85	17.88	18.75	18.76	18.79
		RB50#0	17.86	17.66	17.79	18.77	18.57	18.70

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	19.78	19.44	19.54	20.69	20.35	20.45
		RB1#38	19.71	19.42	19.63	20.62	20.33	20.54
		RB1#74	19.75	19.37	19.78	20.66	20.28	20.69
		RB36#0	18.70	18.68	18.61	19.61	19.59	19.52
		RB36#39	18.68	18.67	18.76	19.59	19.58	19.67
		RB75#0	18.62	18.58	18.68	19.53	19.49	19.59
	16QAM	RB1#0	18.84	18.74	19.02	19.75	19.65	19.93
		RB1#38	18.88	18.72	19.12	19.79	19.63	20.03
		RB1#74	18.82	18.72	19.28	19.73	19.63	20.19
		RB36#0	17.90	17.76	17.65	18.81	18.67	18.56
		RB36#39	17.85	17.68	17.84	18.76	18.59	18.75
		RB75#0	17.81	17.63	17.78	18.72	18.54	18.69
20.0	QPSK	RB1#0	19.72	19.61	19.62	20.63	20.52	20.53
		RB1#50	19.61	19.54	19.61	20.52	20.45	20.52
		RB1#99	19.62	19.64	19.85	20.53	20.55	20.76
		RB50#0	18.63	18.72	18.48	19.54	19.63	19.39
		RB50#50	18.76	18.57	18.64	19.67	19.48	19.55
		RB100#0	18.57	18.53	18.68	19.48	19.44	19.59
	16QAM	RB1#0	18.98	19.36	18.77	19.89	20.27	19.68
		RB1#50	18.93	19.29	18.71	19.84	20.20	19.62
		RB1#99	18.93	19.46	18.95	19.84	20.37	19.86
		RB50#0	17.85	17.71	17.78	18.76	18.62	18.69
		RB50#50	17.82	17.70	17.87	18.73	18.61	18.78
		RB100#0	17.76	17.66	17.67	18.67	18.57	18.58

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band2: Antenna Gain = 0.91dBi

Limit: EIRP ≤ 33dBm

LTE Band5

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	24.36	24.35	24.3	20.56	20.55	20.50
		RB1#3	24.31	24.33	24.24	20.51	20.53	20.44
		RB1#5	24.28	24.33	24.22	20.48	20.53	20.42
		RB3#0	24.39	24.38	24.19	20.59	20.58	20.39
		RB3#3	24.34	24.33	24.23	20.54	20.53	20.43
		RB6#0	23.38	23.21	23.18	19.58	19.41	19.38
	16QAM	RB1#0	23.88	23.94	23.17	20.08	20.14	19.37
		RB1#3	23.83	24.07	23.24	20.03	20.27	19.44
		RB1#5	23.86	24.04	23.01	20.06	20.24	19.21
		RB3#0	23.52	23.34	23.03	19.72	19.54	19.23
		RB3#3	23.47	23.3	23.03	19.67	19.50	19.23
		RB6#0	22.56	22.46	22.26	18.76	18.66	18.46
3.0	QPSK	RB1#0	24.26	24.26	24.2	20.46	20.46	20.40
		RB1#8	24.3	24.28	24.14	20.50	20.48	20.34
		RB1#14	24.21	24.26	24.23	20.41	20.46	20.43
		RB6#0	23.39	23.3	23.16	19.59	19.50	19.36
		RB6#9	23.27	23.33	23.07	19.47	19.53	19.27
		RB15#0	23.28	23.28	23.24	19.48	19.48	19.44
	16QAM	RB1#0	24.06	22.8	23.47	20.26	19.00	19.67
		RB1#8	23.98	22.7	23.46	20.18	18.90	19.66
		RB1#14	23.94	22.74	23.38	20.14	18.94	19.58
		RB6#0	22.45	22.35	22.34	18.65	18.55	18.54
		RB6#9	22.43	22.34	22.3	18.63	18.54	18.50
		RB15#0	22.36	22.32	22.28	18.56	18.52	18.48

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	24.35	24.14	24.07	20.55	20.34	20.27
		RB1#13	24.31	24.1	24.08	20.51	20.30	20.28
		RB1#24	24.36	24.11	24.05	20.56	20.31	20.25
		RB15#0	23.24	23.28	23.17	19.44	19.48	19.37
		RB15#10	23.18	23.28	23.18	19.38	19.48	19.38
		RB25#0	23.24	23.32	23.24	19.44	19.52	19.44
	16QAM	RB1#0	23.34	23.25	22.4	19.54	19.45	18.60
		RB1#13	23.31	23.26	22.41	19.51	19.46	18.61
		RB1#24	23.35	23.31	22.33	19.55	19.51	18.53
		RB15#0	22.21	22.14	22.27	18.41	18.34	18.47
		RB15#10	22.1	22.15	22.22	18.30	18.35	18.42
		RB25#0	22.28	22.28	22.28	18.48	18.48	18.48
10.0	QPSK	RB1#0	24.42	24.27	24.24	20.62	20.47	20.44
		RB1#25	24.24	24.16	24.12	20.44	20.36	20.32
		RB1#49	24.27	24.13	24.14	20.47	20.33	20.34
		RB25#0	23.2	23.19	23.21	19.40	19.39	19.41
		RB25#25	23.31	23.29	23.23	19.51	19.49	19.43
		RB50#0	23.3	23.27	23.16	19.50	19.47	19.36
	16QAM	RB1#0	23.44	23.11	23.67	19.64	19.31	19.87
		RB1#25	23.37	22.99	23.56	19.57	19.19	19.76
		RB1#49	23.35	22.9	23.54	19.55	19.10	19.74
		RB25#0	22.4	22.38	22.23	18.60	18.58	18.43
		RB25#25	22.38	22.45	22.25	18.58	18.65	18.45
		RB50#0	22.39	22.32	22.17	18.59	18.52	18.37

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss

For Band5: Antenna Gain = -1.15dBi = -3.30dBd (0dBd=2.15dBi)

Cable Loss=0.5dB*(provided by the applicant)

Limit: ERP≤38.45dBm

LTE Band 7

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.25	23.37	23.33	24.23	24.35	24.31
		RB1#13	23.25	23.43	23.34	24.23	24.41	24.32
		RB1#24	23.42	23.39	23.35	24.40	24.37	24.33
		RB15#0	22.27	22.42	22.43	23.25	23.40	23.41
		RB15#10	22.26	22.32	22.5	23.24	23.30	23.48
		RB25#0	22.21	22.43	22.4	23.19	23.41	23.38
	16QAM	RB1#0	22.28	21.99	21.63	23.26	22.97	22.61
		RB1#13	22.31	22.02	21.71	23.29	23.00	22.69
		RB1#24	22.29	21.99	21.74	23.27	22.97	22.72
		RB15#0	21.23	21.41	21.51	22.21	22.39	22.49
		RB15#10	21.28	21.45	21.53	22.26	22.43	22.51
		RB25#0	21.39	21.33	21.61	22.37	22.31	22.59
10.0	QPSK	RB1#0	23.11	23.34	23.34	24.09	24.32	24.32
		RB1#25	23.15	23.36	23.29	24.13	24.34	24.27
		RB1#49	23.33	23.39	23.39	24.31	24.37	24.37
		RB25#0	22.31	22.41	22.42	23.29	23.39	23.40
		RB25#25	22.33	22.36	22.38	23.31	23.34	23.36
		RB50#0	22.24	22.41	22.47	23.22	23.39	23.45
	16QAM	RB1#0	22.94	21.83	22.65	23.92	22.81	23.63
		RB1#25	23.02	21.87	22.62	24.00	22.85	23.60
		RB1#49	23.11	21.93	22.68	24.09	22.91	23.66
		RB25#0	21.42	21.6	21.56	22.40	22.58	22.54
		RB25#25	21.45	21.56	21.57	22.43	22.54	22.55
		RB50#0	21.37	21.54	21.51	22.35	22.52	22.49

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.19	23.33	23.3	24.17	24.31	24.28
		RB1#38	23.21	23.36	23.25	24.19	24.34	24.23
		RB1#74	23.25	23.4	23.33	24.23	24.38	24.31
		RB36#0	22.29	22.39	22.41	23.27	23.37	23.39
		RB36#39	22.27	22.37	22.44	23.25	23.35	23.42
		RB75#0	22.26	22.42	22.45	23.24	23.40	23.43
	16QAM	RB1#0	23.02	22.73	22.58	24.00	23.71	23.56
		RB1#38	23.08	22.75	22.67	24.06	23.73	23.65
		RB1#74	23.12	22.84	22.67	24.10	23.82	23.65
		RB36#0	21.4	21.49	21.63	22.38	22.47	22.61
		RB36#39	21.45	21.54	21.55	22.43	22.52	22.53
		RB75#0	21.47	21.47	21.56	22.45	22.45	22.54
20.0	QPSK	RB1#0	23.18	23.2	23.39	24.16	24.18	24.37
		RB1#50	23.29	23.21	23.47	24.27	24.19	24.45
		RB1#99	23.35	23.33	23.47	24.33	24.31	24.45
		RB50#0	22.41	22.4	22.5	23.39	23.38	23.48
		RB50#50	22.39	22.46	22.47	23.37	23.44	23.45
		RB100#0	22.39	22.38	22.44	23.37	23.36	23.42
	16QAM	RB1#0	22.71	23.12	22.3	23.69	24.10	23.28
		RB1#50	22.78	23.16	22.49	23.76	24.14	23.47
		RB1#99	22.84	23.3	22.41	23.82	24.28	23.39
		RB50#0	21.57	21.5	21.56	22.55	22.48	22.54
		RB50#50	21.59	21.47	21.54	22.57	22.45	22.52
		RB100#0	21.37	21.53	21.59	22.35	22.51	22.57

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)- Cable Loss

For Band7: Antenna Gain = 1.78dBi

Cable Loss=0.8dB*(provided by the applicant)

Limit: EIRP≤33dBm

LTE Band 12

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	23.8	23.76	23.79	19.23	19.19	19.22
		RB1#3	23.88	23.67	23.87	19.31	19.10	19.30
		RB1#5	23.91	23.72	23.79	19.34	19.15	19.22
		RB3#0	23.86	23.64	23.89	19.29	19.07	19.32
		RB3#3	23.73	23.78	23.91	19.16	19.21	19.34
		RB6#0	22.82	22.68	22.73	18.25	18.11	18.16
	16QAM	RB1#0	23.47	22.8	23.22	18.90	18.23	18.65
		RB1#3	23.46	22.79	23.31	18.89	18.22	18.74
		RB1#5	23.41	22.9	23.55	18.84	18.33	18.98
		RB3#0	22.63	22.52	22.74	18.06	17.95	18.17
		RB3#3	22.63	22.5	22.73	18.06	17.93	18.16
		RB6#0	21.78	21.71	21.81	17.21	17.14	17.24
3.0	QPSK	RB1#0	23.87	23.72	23.75	19.30	19.15	19.18
		RB1#8	23.86	23.81	23.79	19.29	19.24	19.22
		RB1#14	23.84	23.7	23.79	19.27	19.13	19.22
		RB6#0	22.86	22.69	22.84	18.29	18.12	18.27
		RB6#9	22.84	22.8	22.76	18.27	18.23	18.19
		RB15#0	22.78	22.77	22.87	18.21	18.20	18.30
	16QAM	RB1#0	22.9	22.25	23.03	18.33	17.68	18.46
		RB1#8	22.89	22.22	22.99	18.32	17.65	18.42
		RB1#14	23	22.2	22.97	18.43	17.63	18.40
		RB6#0	21.88	21.78	21.85	17.31	17.21	17.28
		RB6#9	21.9	21.81	21.82	17.33	17.24	17.25
		RB15#0	21.75	21.73	21.92	17.18	17.16	17.35

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.88	23.59	23.64	19.31	19.02	19.07
		RB1#13	23.82	23.66	23.64	19.25	19.09	19.07
		RB1#24	23.91	23.68	23.64	19.34	19.11	19.07
		RB15#0	22.72	22.77	22.71	18.15	18.20	18.14
		RB15#10	22.69	22.68	22.76	18.12	18.11	18.19
		RB25#0	22.7	22.69	22.71	18.13	18.12	18.14
	16QAM	RB1#0	22.62	22.71	21.91	18.05	18.14	17.34
		RB1#13	22.66	22.66	21.87	18.09	18.09	17.30
		RB1#24	22.58	22.79	21.92	18.01	18.22	17.35
		RB15#0	21.54	21.63	21.71	16.97	17.06	17.14
		RB15#10	21.52	21.62	21.74	16.95	17.05	17.17
		RB25#0	21.64	21.78	21.81	17.07	17.21	17.24
10.0	QPSK	RB1#0	23.79	23.75	23.74	19.22	19.18	19.17
		RB1#25	23.79	23.58	23.72	19.22	19.01	19.15
		RB1#49	23.76	23.72	23.75	19.19	19.15	19.18
		RB25#0	22.77	22.69	22.72	18.20	18.12	18.15
		RB25#25	22.76	22.79	22.91	18.19	18.22	18.34
		RB50#0	22.79	22.79	22.69	18.22	18.22	18.12
	16QAM	RB1#0	23.49	22.52	22.82	18.92	17.95	18.25
		RB1#25	23.44	22.36	22.96	18.87	17.79	18.39
		RB1#49	23.38	22.48	22.87	18.81	17.91	18.30
		RB25#0	21.81	21.85	21.75	17.24	17.28	17.18
		RB25#25	21.82	22.01	21.8	17.25	17.44	17.23
		RB50#0	21.72	21.79	21.89	17.15	17.22	17.32

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd)- Cable Loss

For Band12: Antenna Gain = -1.92dBi = -4.07dBd (0dBd=2.15dBi)

Cable Loss=0.5dB*(provided by the applicant)

Limit: ERP≤34.77dBm

LTE Band 41

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.53	23.68	23.2	24.52	24.67	24.19
		RB1#13	23.52	23.57	23.21	24.51	24.56	24.20
		RB1#24	23.57	23.59	23.28	24.56	24.58	24.27
		RB15#0	22.49	22.55	22.34	23.48	23.54	23.33
		RB15#10	22.52	22.57	22.22	23.51	23.56	23.21
		RB25#0	22.41	22.63	22.28	23.40	23.62	23.27
	16QAM	RB1#0	22.56	22.83	22.06	23.55	23.82	23.05
		RB1#13	22.21	22.9	22.01	23.20	23.89	23.00
		RB1#24	22.44	22.94	22.17	23.43	23.93	23.16
		RB15#0	21.58	21.78	21.52	22.57	22.77	22.51
		RB15#10	21.65	21.8	21.57	22.64	22.79	22.56
		RB25#0	21.64	21.8	21.16	22.63	22.79	22.15
10.0	QPSK	RB1#0	23.58	23.51	23.36	24.57	24.50	24.35
		RB1#25	23.48	23.56	23.31	24.47	24.55	24.30
		RB1#49	23.54	23.52	23.47	24.53	24.51	24.46
		RB25#0	22.45	22.66	22.33	23.44	23.65	23.32
		RB25#25	22.51	22.58	22.22	23.50	23.57	23.21
		RB50#0	22.45	22.58	22.29	23.44	23.57	23.28
	16QAM	RB1#0	22.67	22.51	22.4	23.66	23.50	23.39
		RB1#25	22.77	22.51	22.48	23.76	23.50	23.47
		RB1#49	22.55	22.39	22.43	23.54	23.38	23.42
		RB25#0	21.77	21.91	21.3	22.76	22.90	22.29
		RB25#25	21.74	22.02	21.31	22.73	23.01	22.30
		RB50#0	21.77	21.75	21.4	22.76	22.74	22.39

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.47	23.54	23.43	24.46	24.53	24.42
		RB1#38	23.47	23.54	23.37	24.46	24.53	24.36
		RB1#74	23.51	23.55	23.42	24.50	24.54	24.41
		RB36#0	22.39	22.53	22.42	23.38	23.52	23.41
		RB36#39	22.44	22.58	22.3	23.43	23.57	23.29
		RB75#0	22.41	22.53	22.37	23.40	23.52	23.36
	16QAM	RB1#0	22.65	21.99	22.51	23.64	22.98	23.50
		RB1#38	22.54	22.08	22.55	23.53	23.07	23.54
		RB1#74	22.8	21.95	22.49	23.79	22.94	23.48
		RB36#0	21.43	21.85	21.4	22.42	22.84	22.39
		RB36#39	21.47	21.91	21.31	22.46	22.90	22.30
		RB75#0	21.57	21.68	21.43	22.56	22.67	22.42
20.0	QPSK	RB1#0	23.27	23.69	23.33	24.26	24.68	24.32
		RB1#50	23.51	23.72	23.33	24.50	24.71	24.32
		RB1#99	23.52	23.73	23.32	24.51	24.72	24.31
		RB50#0	22.41	22.56	22.38	23.40	23.55	23.37
		RB50#50	22.51	22.62	22.27	23.50	23.61	23.26
		RB100#0	22.42	22.57	22.36	23.41	23.56	23.35
	16QAM	RB1#0	22.21	23.07	22.85	23.20	24.06	23.84
		RB1#50	22.38	23.23	22.72	23.37	24.22	23.71
		RB1#99	22.33	23.25	22.72	23.32	24.24	23.71
		RB50#0	21.5	21.62	21.6	22.49	22.61	22.59
		RB50#50	21.64	21.69	21.58	22.63	22.68	22.57
		RB100#0	21.41	21.63	21.5	22.40	22.62	22.49

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)- Cable Loss

For Band41: Antenna Gain = 1.79dBi

Cable Loss=0.8dB*(provided by the applicant)

Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	8.67	13
	Middle	9.94	13
	High	9.91	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC	Low	3.07	13
	Middle	3.57	13
	High	3.04	13
HSDPA	Low	4.17	13
	Middle	4.20	13
	High	6.00	13
HSUPA	Low	5.51	13
	Middle	5.88	13
	High	5.62	13
HSPA+	Low	5.03	13
	Middle	5.12	13
	High	5.06	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	9.97	13
	Middle	9.97	13
	High	9.83	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC	Low	3.13	13
	Middle	3.10	13
	High	3.13	13
HSDPA	Low	4.23	13
	Middle	4.17	13
	High	4.38	13
HSUPA	Low	5.88	13
	Middle	5.97	13
	High	5.10	13
HSPA+	Low	5.12	13
	Middle	5.09	13
	High	5.01	13

LTE Band: (pre-scan all bandwidth, the worst case as below)

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.04	5.25	5.77	13	Pass
QPSK (100RB Size)	4.29	4.35	4.38	13	Pass
16QAM (1RB Size)	5.86	6.41	6.52	13	Pass
16QAM (100RB Size)	5.91	5.91	5.97	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.36	3.13	4.17	13	Pass
QPSK (50RB Size)	4.26	4.58	4.49	13	Pass
16QAM (1RB Size)	4.49	4	5.19	13	Pass
16QAM (50RB Size)	5.19	5.57	5.51	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.62	3.36	3.59	13	Pass
QPSK (100RB Size)	3.83	3.59	3.54	13	Pass
16QAM (1RB Size)	4.61	4.29	4.72	13	Pass
16QAM (100RB Size)	5.57	5.3	5.25	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.06	4.06	4.55	13	Pass
QPSK (50RB Size)	4.96	5.19	4.9	13	Pass
16QAM (1RB Size)	4.72	4.96	6.17	13	Pass
16QAM (50RB Size)	6.06	6.12	5.86	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	8.70	8.36	8.79	13	Pass
QPSK (100RB Size)	8.98	8.65	8.80	13	Pass
16QAM (1RB Size)	8.65	8.90	8.11	13	Pass
16QAM (100RB Size)	8.02	8.09	8.01	13	Pass

FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH

Applicable Standard

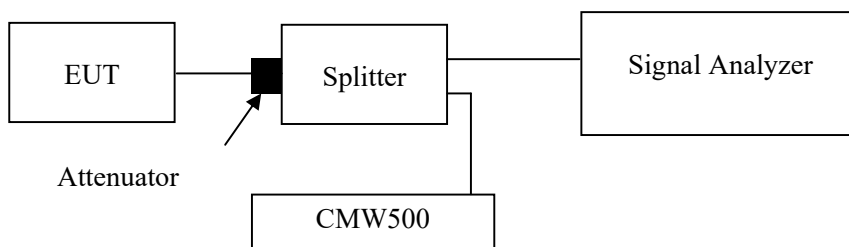
FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

ANSI C63.26-2015 Section 5.4.4

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-06-26 to 2023-06-28.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	128	824.2	244.76	320.0
	190	836.6	240.76	313.0
	251	848.8	243.76	314.0

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.14	4.70
	836.6	4.14	4.68
	846.6	4.15	4.70
HSDPA	826.4	4.17	4.68
	836.6	4.15	4.70
	846.6	4.17	4.71
HSUPA	826.4	4.15	4.68
	836.6	4.15	4.70
	846.6	4.15	4.68

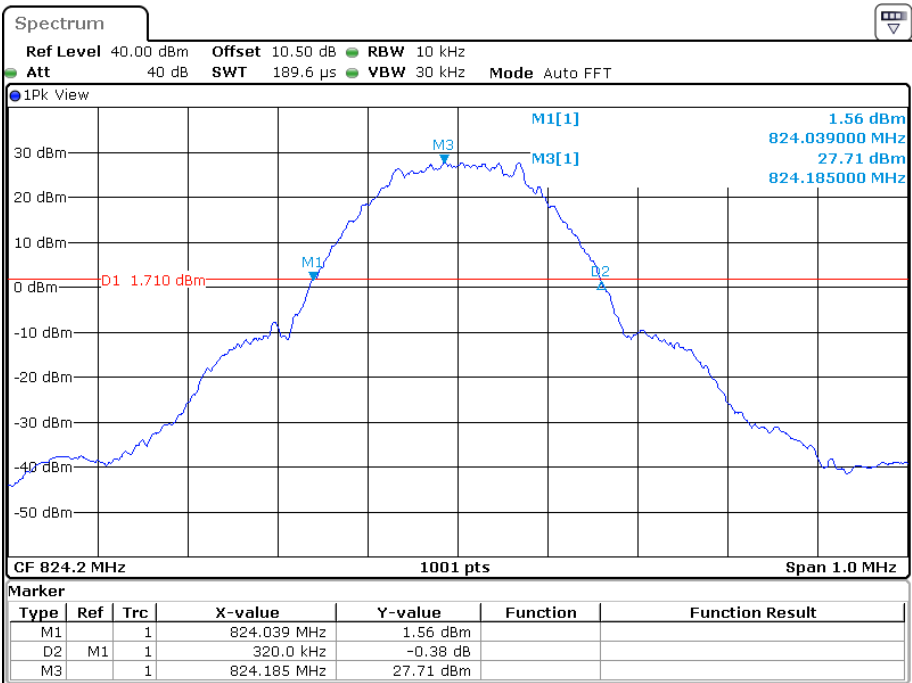
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	241.76	307.0
	661	1880.0	242.76	307.0
	810	1909.8	240.76	312.0

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.14	4.68
	1880.0	4.15	4.71
	1907.6	4.15	4.70
HSDPA	1852.4	4.15	4.71
	1880.0	4.15	4.70
	1907.6	4.15	4.71
HSUPA	1852.4	4.14	4.70
	1880.0	4.15	4.68
	1907.6	4.17	4.71

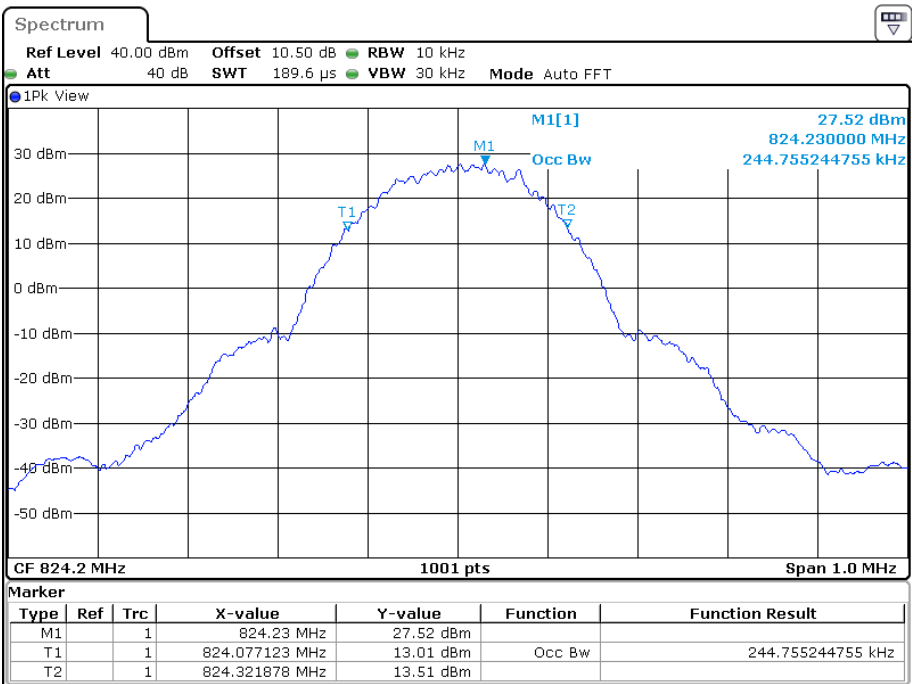
Cellular Band

26 dB Emission Bandwidth for GSM(GMSK) Mode, Low channel



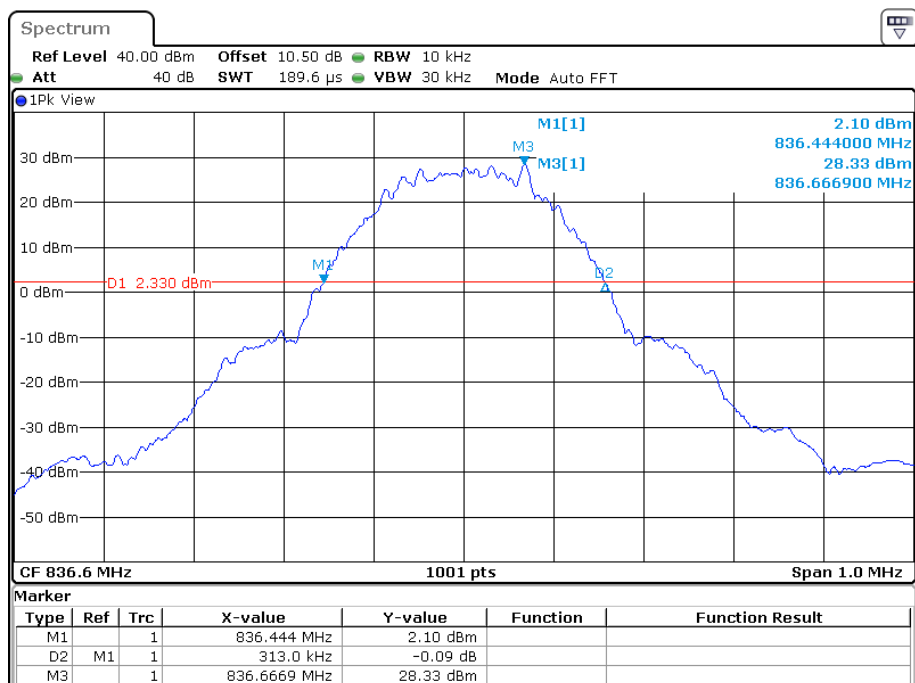
Date: 28.JUN.2023 00:22:57

99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



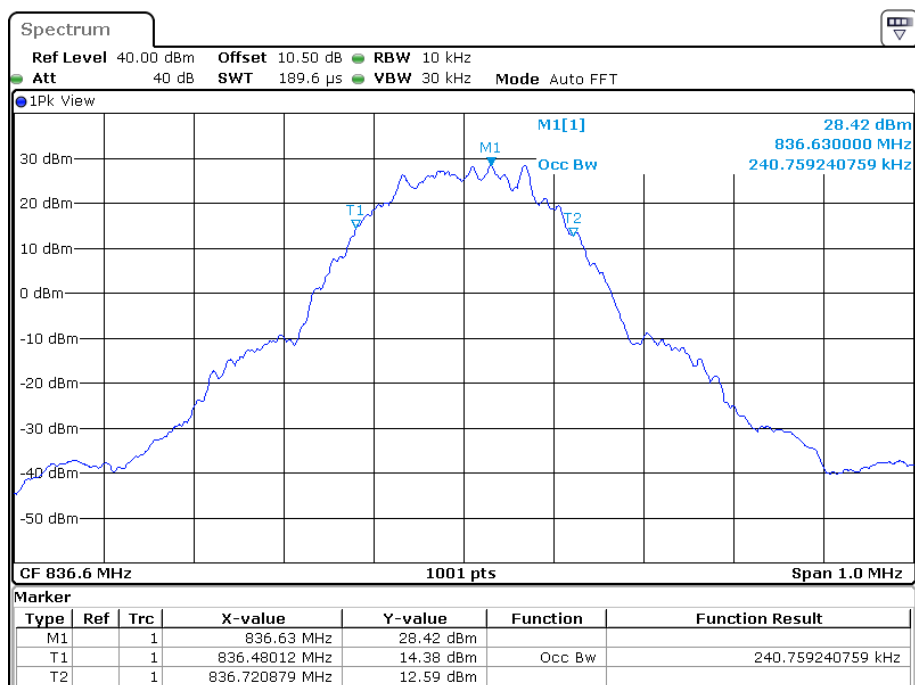
Date: 28.JUN.2023 00:22:33

26 dB Emission Bandwidth for GSM(GMSK) Mode, Middle channel



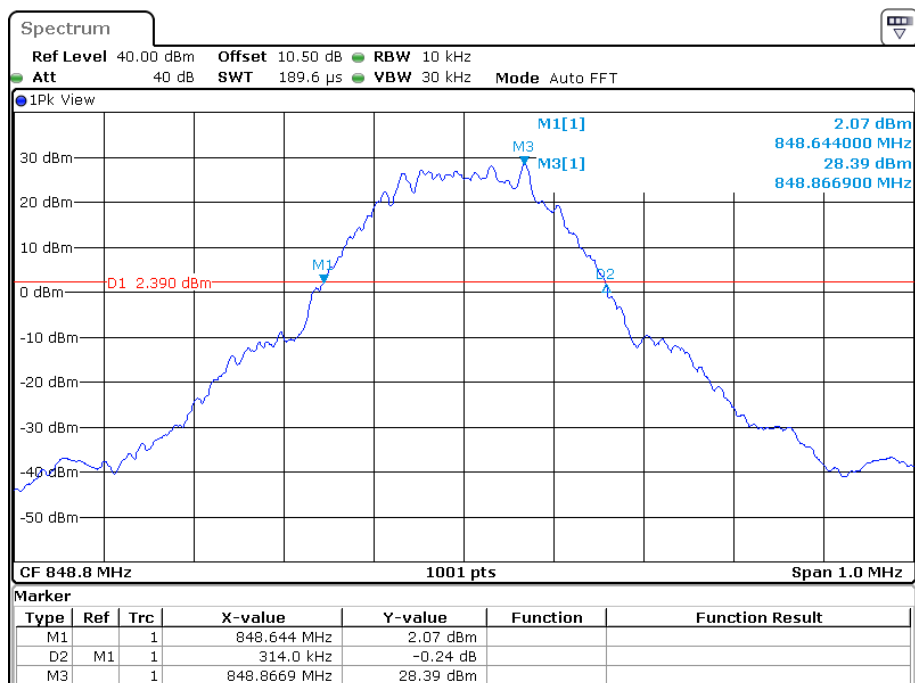
Date: 28.JUN.2023 00:27:06

99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



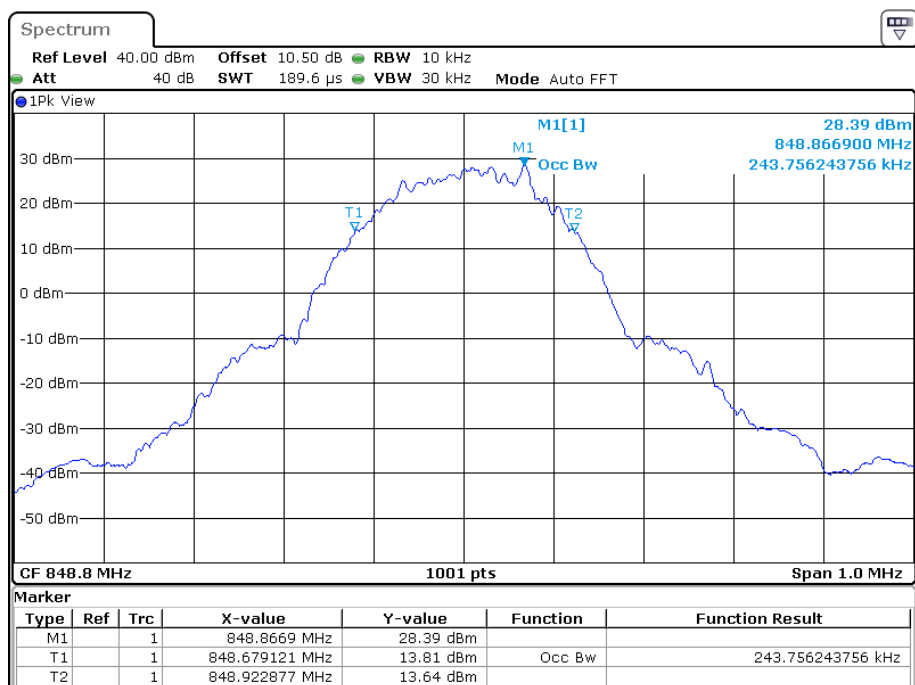
Date: 28.JUN.2023 00:26:35

26 dB Emission Bandwidth for GSM(GMSK) Mode, High channel



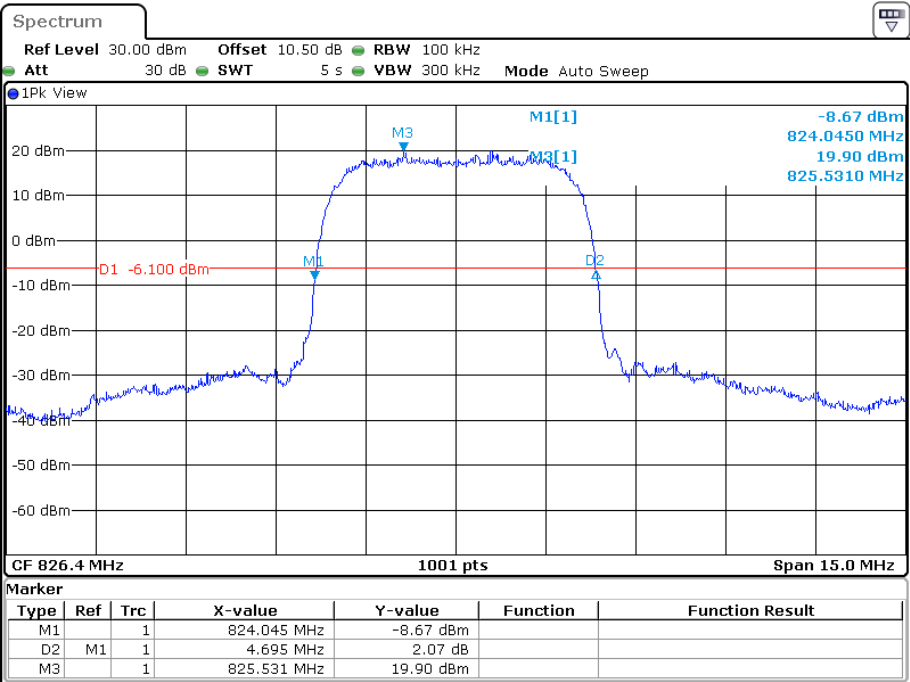
Date: 28.JUN.2023 00:30:42

99% Occupied Bandwidth for GSM(GMSK) Mode, High channel



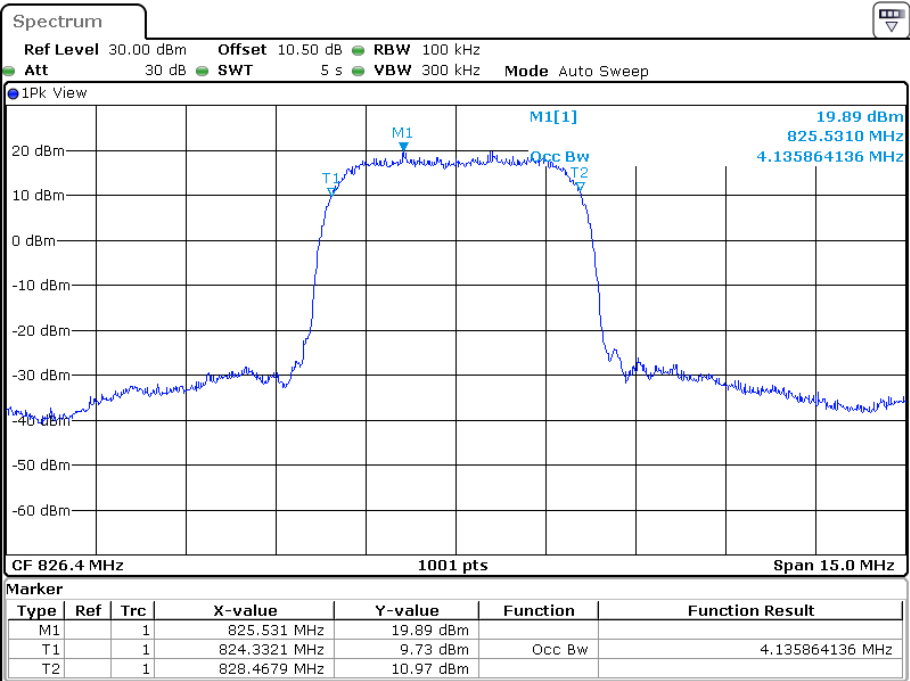
Date: 28.JUN.2023 00:30:19

26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel



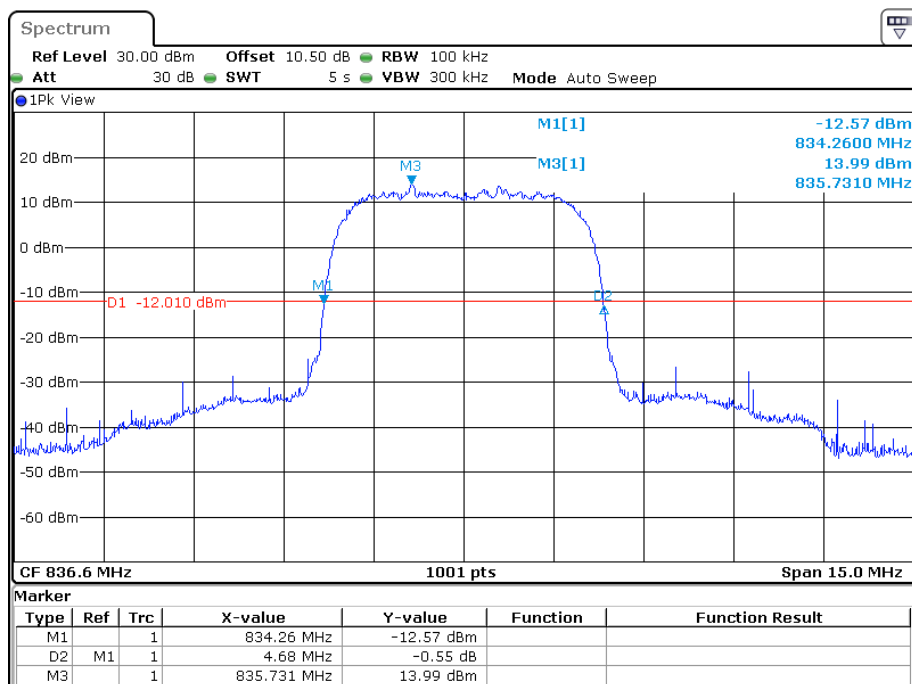
Date: 27.JUN.2023 22:56:01

99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



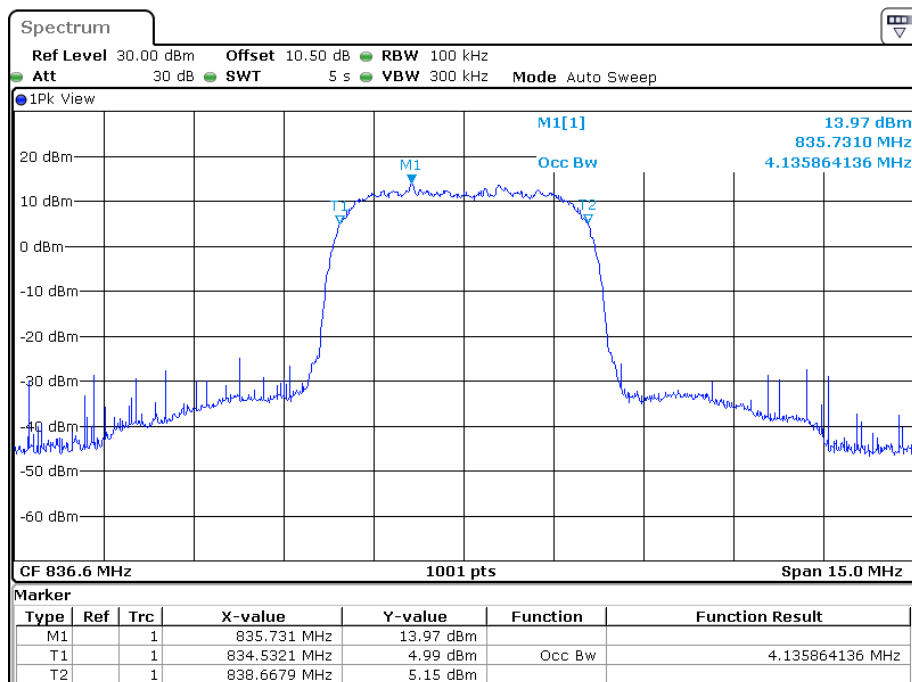
Date: 27.JUN.2023 22:55:34

26 dB Emission Bandwidth for RMC (BPSK) Mode, Middle channel



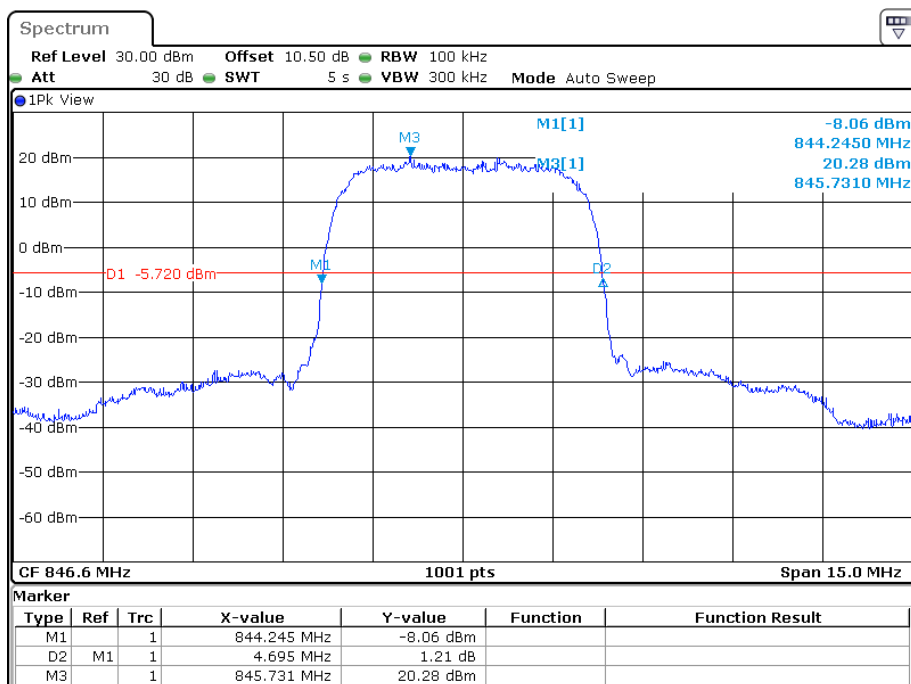
Date: 27.JUN.2023 22:51:55

99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



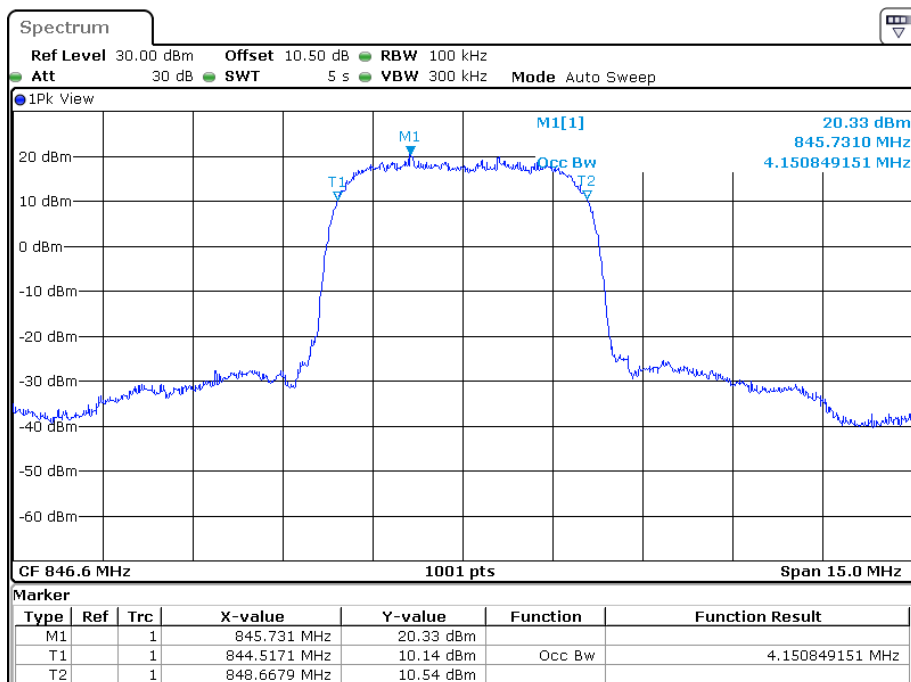
Date: 27.JUN.2023 22:50:57

26 dB Emission Bandwidth for RMC (BPSK) Mode, High channel



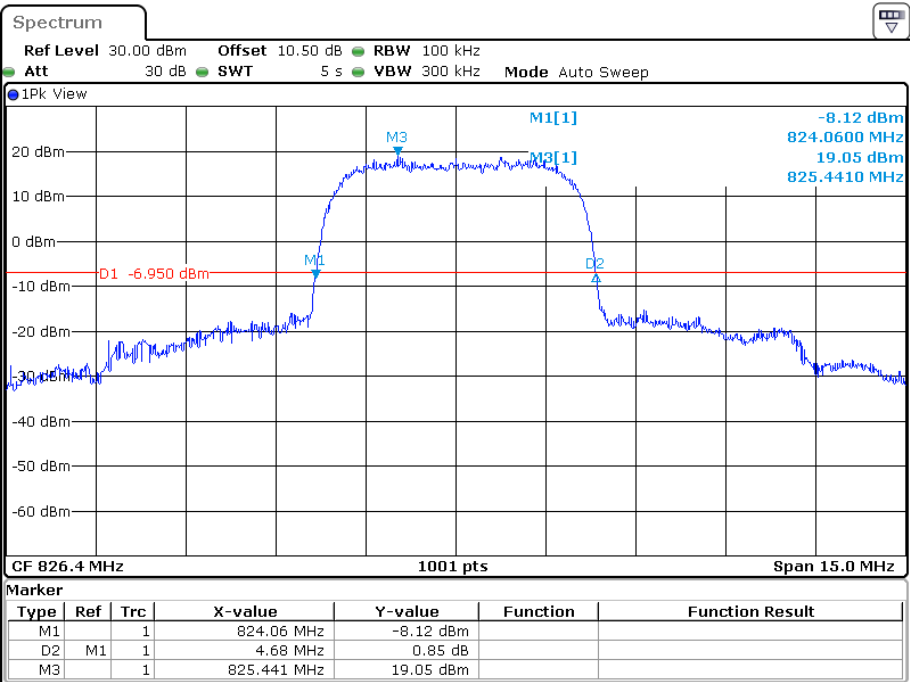
Date: 27.JUN.2023 22:59:14

99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



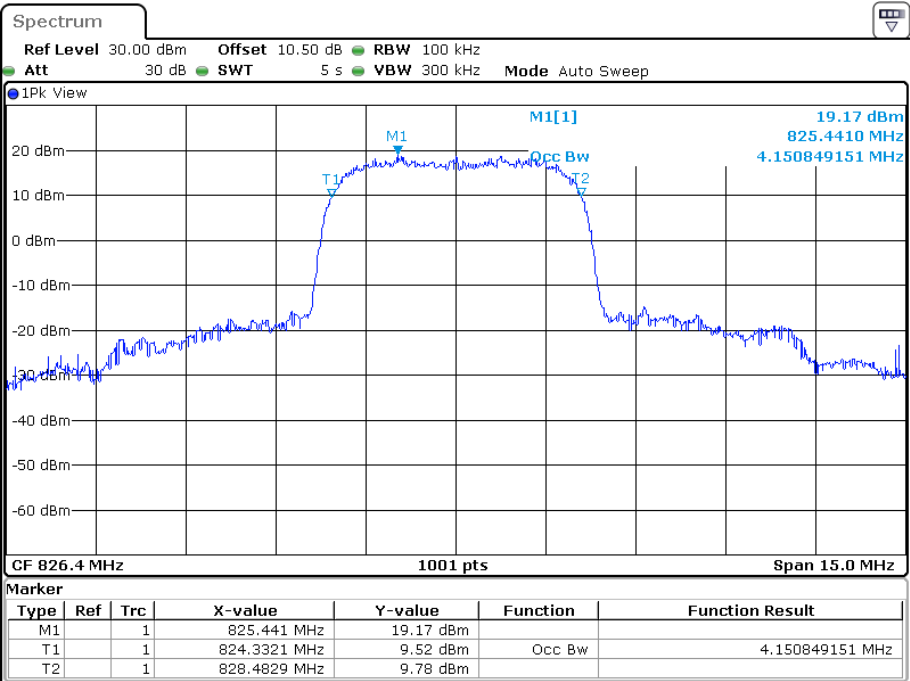
Date: 27.JUN.2023 22:58:47

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Low channel



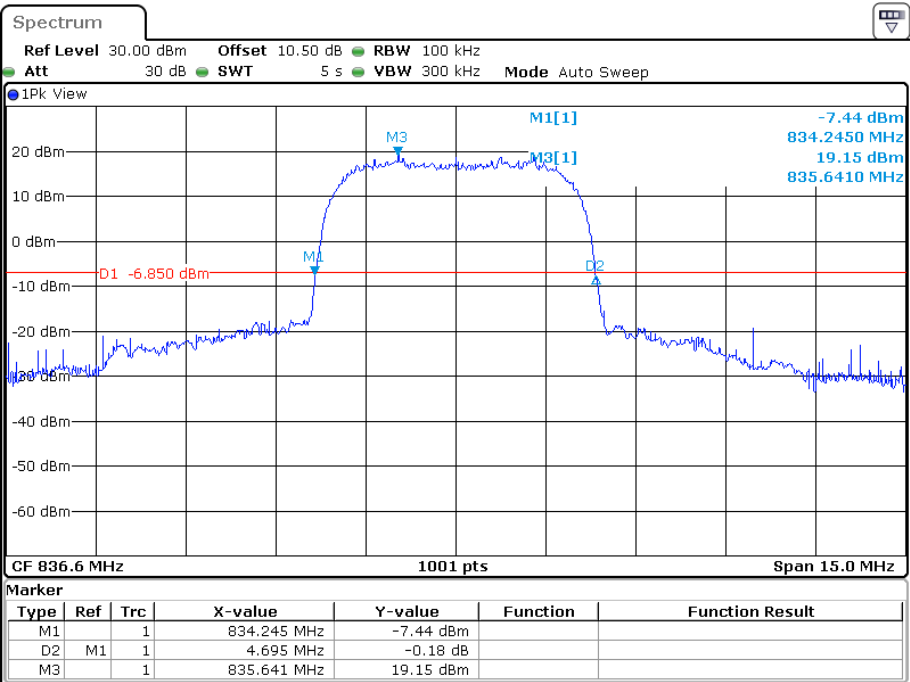
Date: 27.JUN.2023 22:33:08

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel



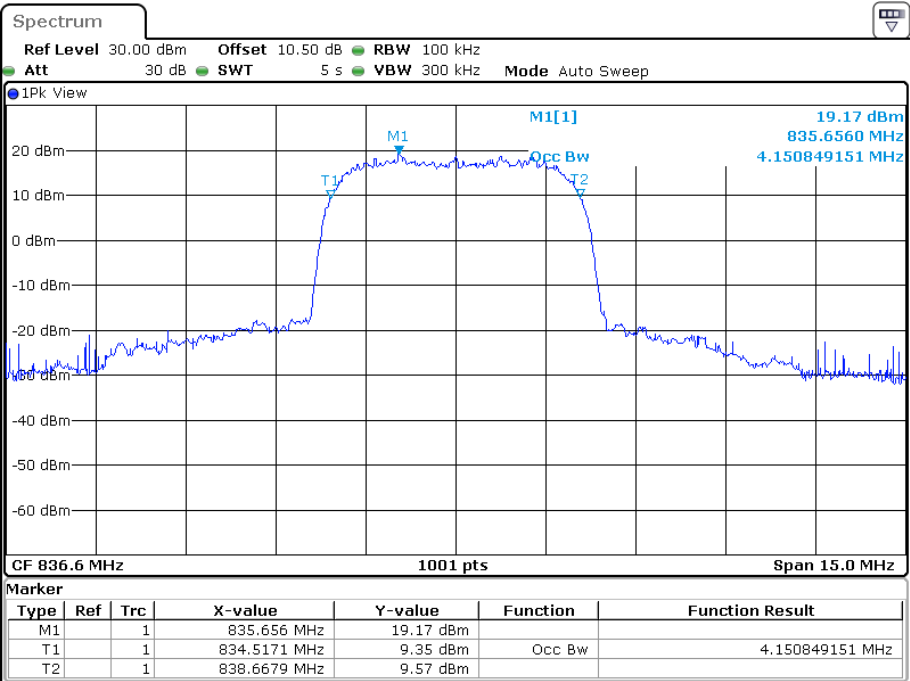
Date: 27.JUN.2023 22:32:40

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Middle channel



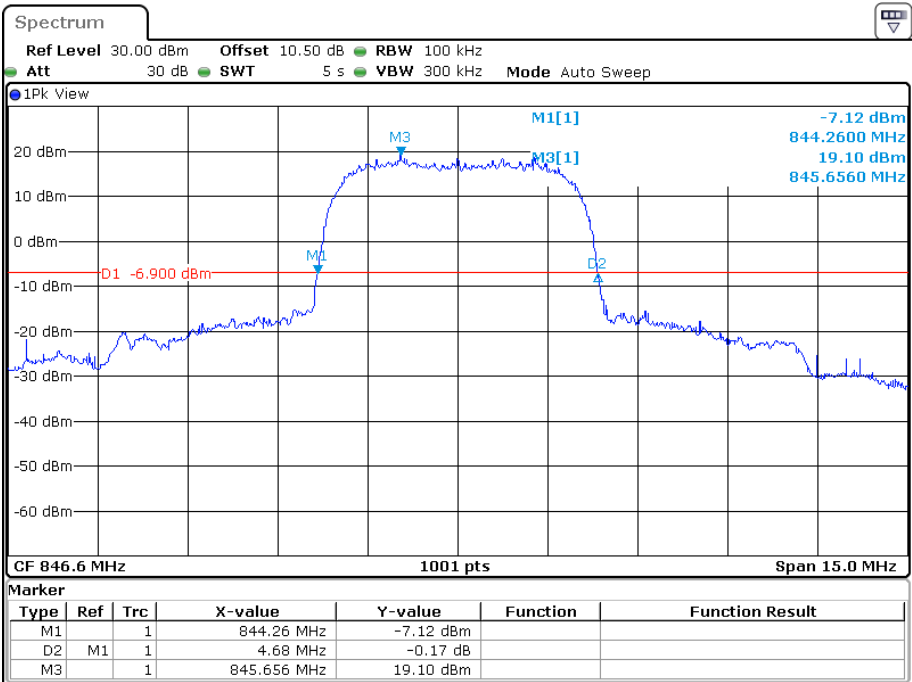
Date: 27.JUN.2023 22:36:34

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel



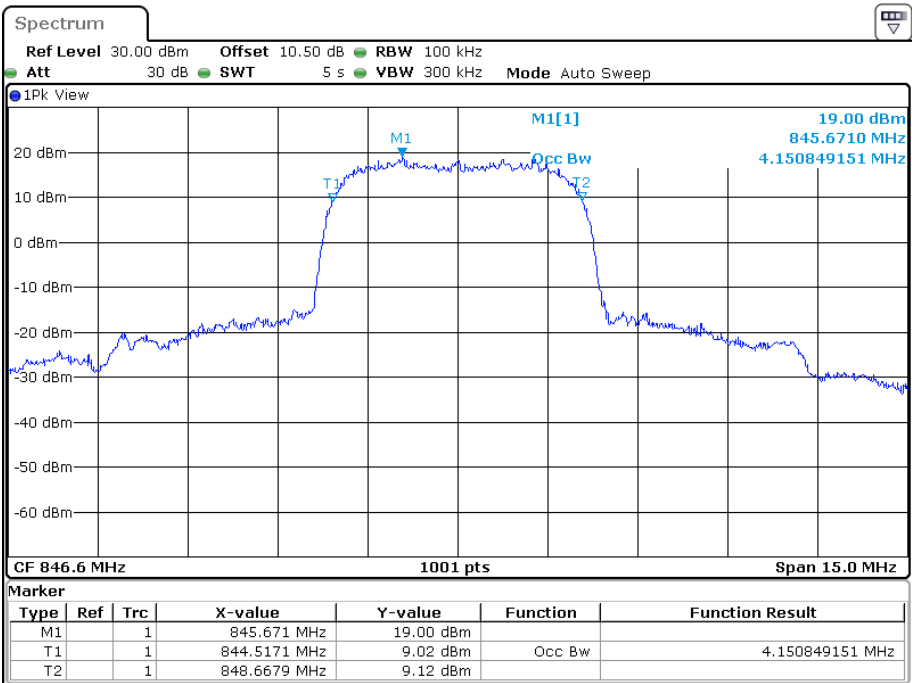
Date: 27.JUN.2023 22:35:56

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel



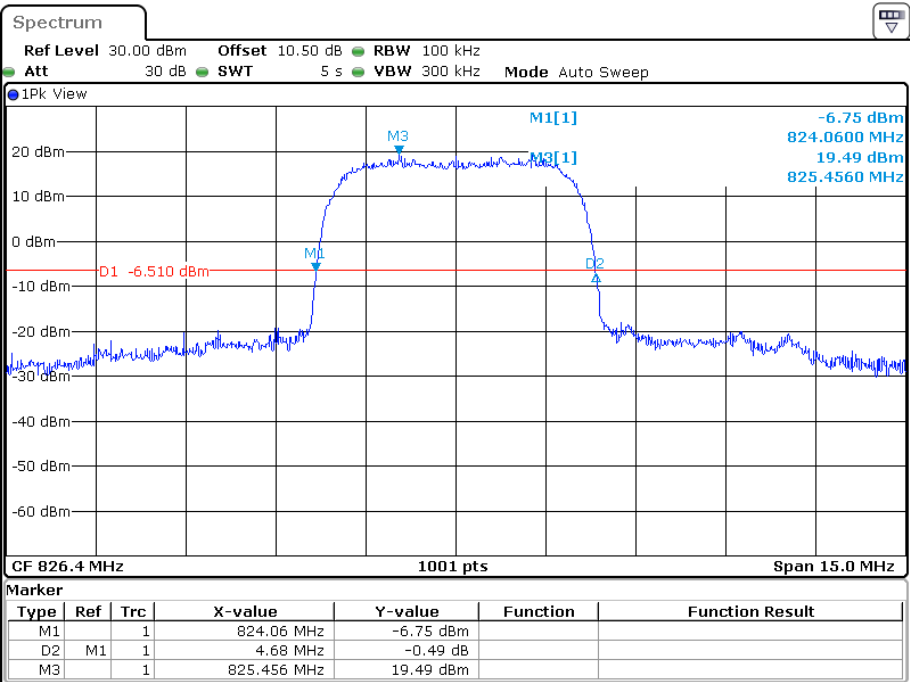
Date: 27.JUN.2023 22:39:04

99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel



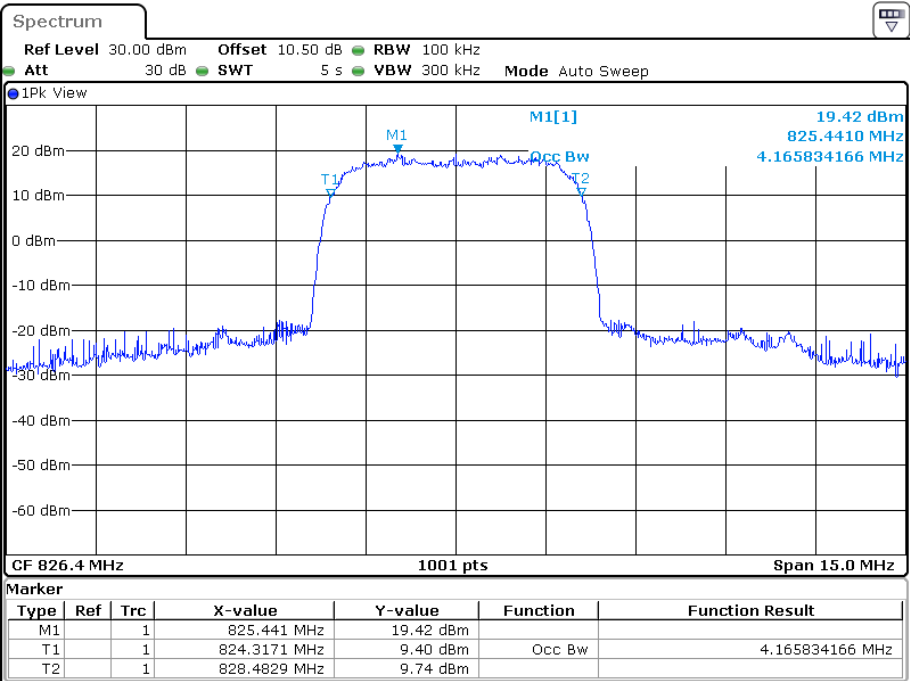
Date: 27.JUN.2023 22:38:23

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Low channel



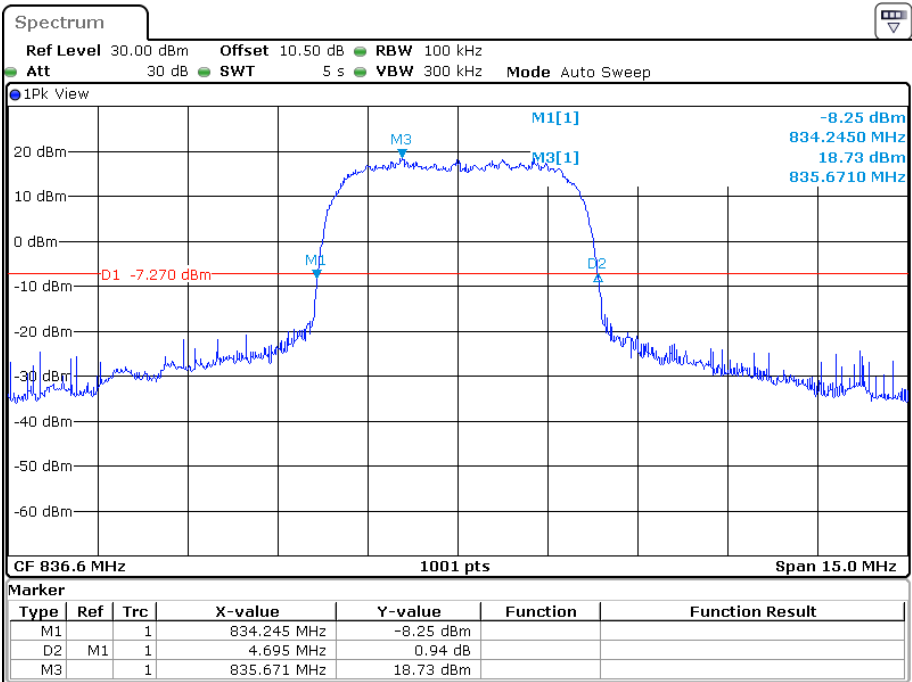
Date: 27.JUN.2023 23:06:09

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



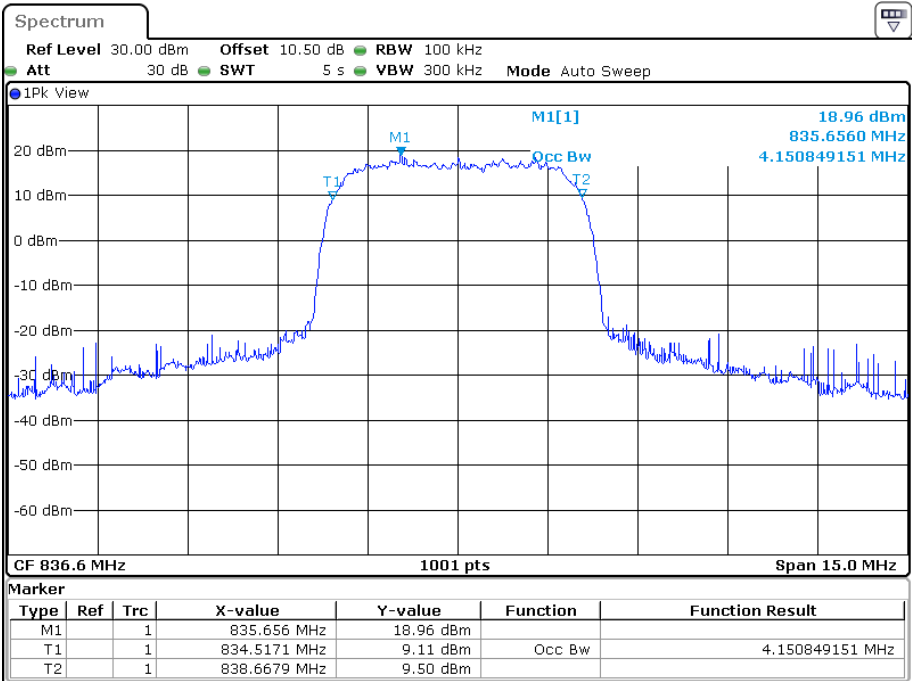
Date: 27.JUN.2023 23:05:27

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Middle channel



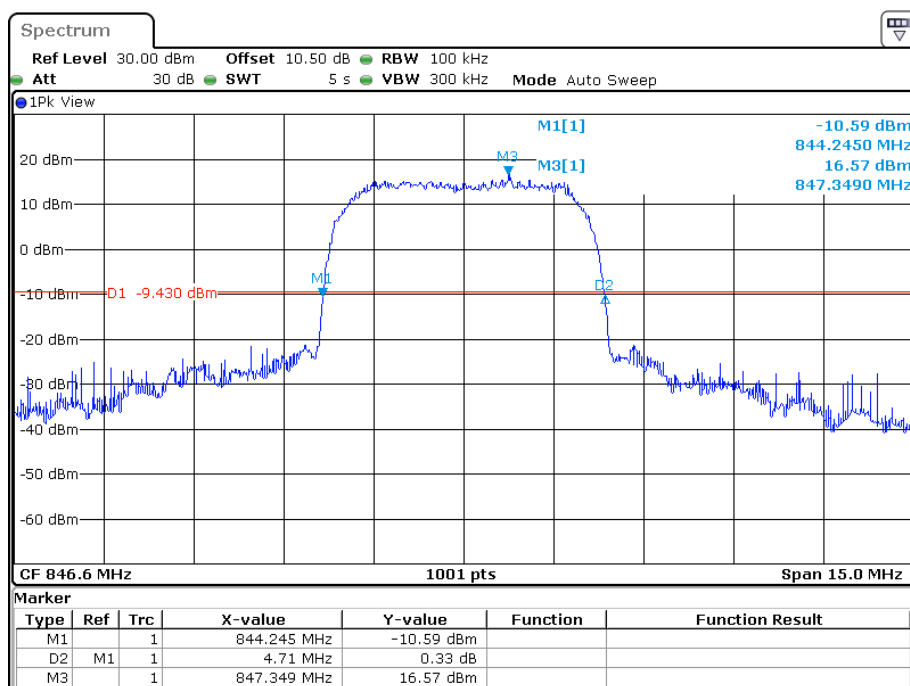
Date: 27.JUN.2023 22:47:02

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



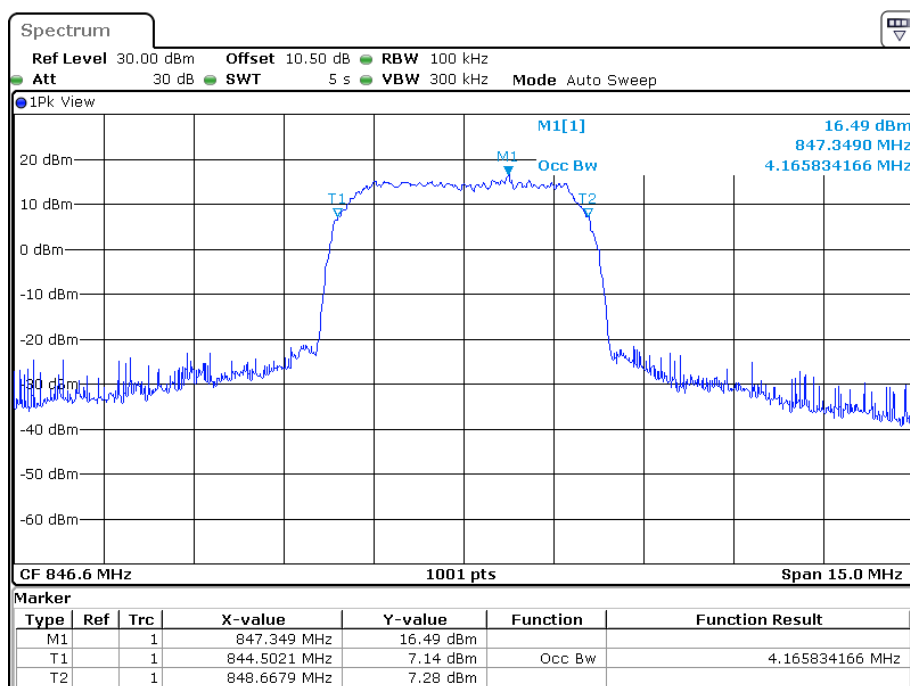
Date: 27.JUN.2023 22:46:25

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 27.JUN.2023 22:43:36

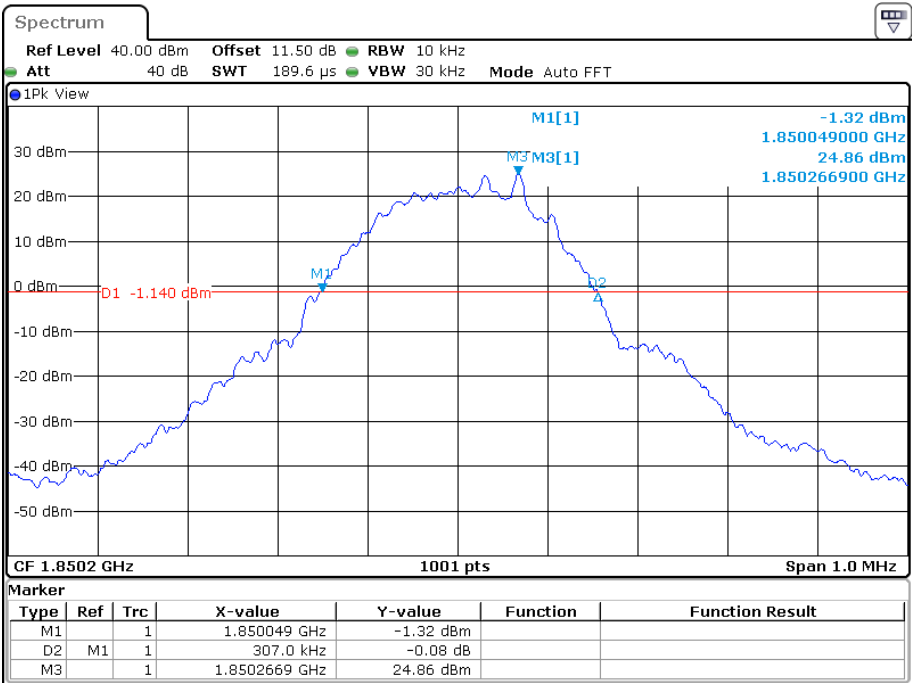
99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 27.JUN.2023 22:42:59

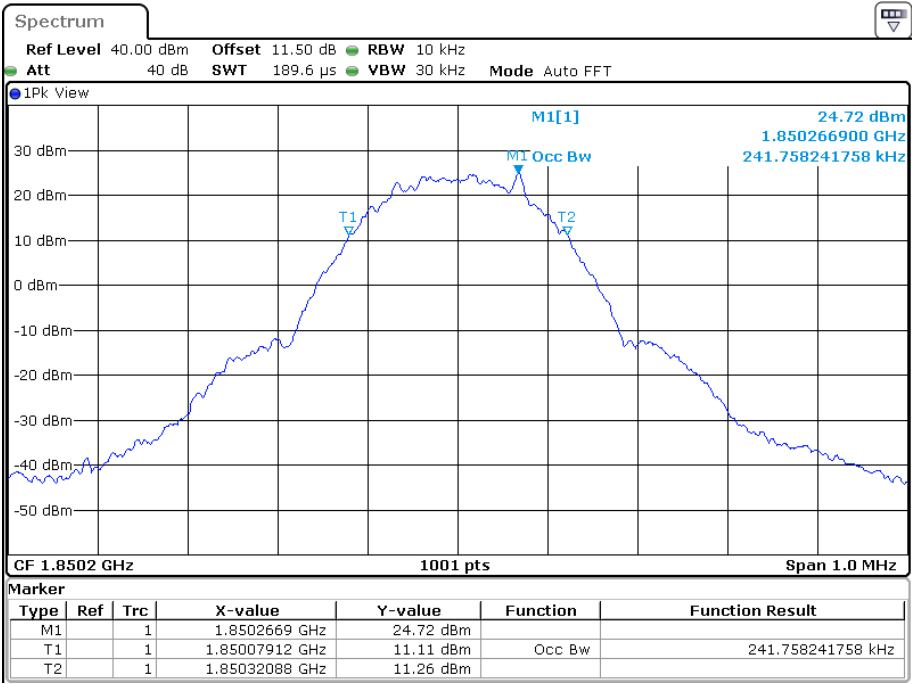
PCS Band

26 dB Emission Bandwidth for GSM(GMSK) Mode, Low channel



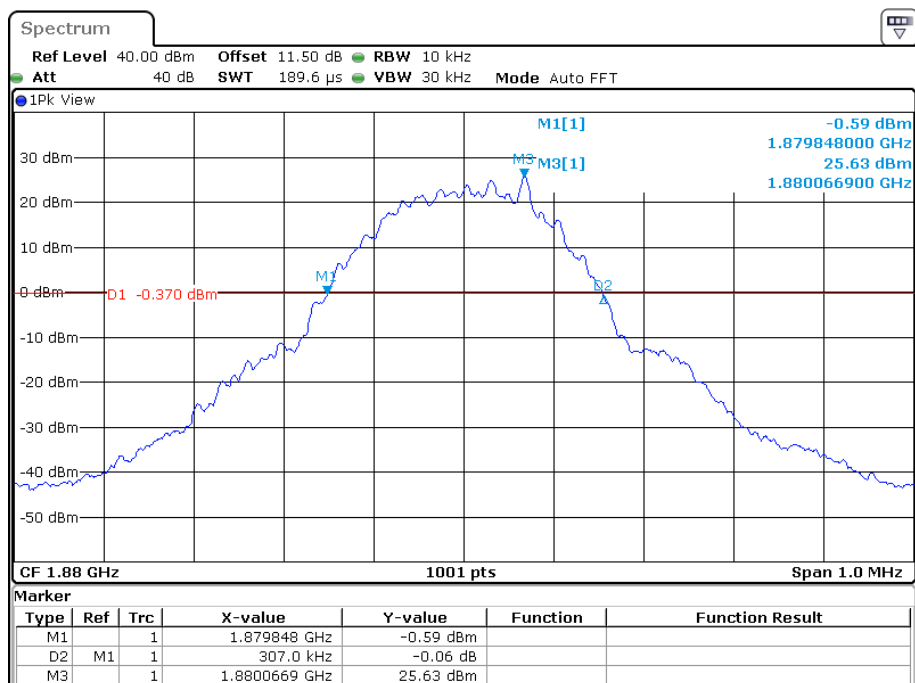
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99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



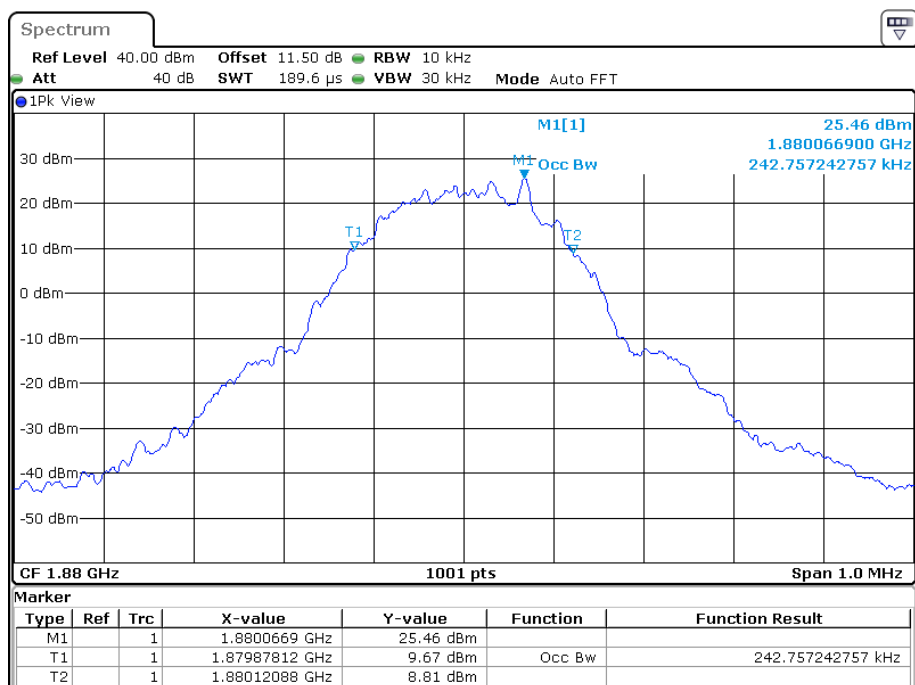
Date: 28.JUN.2023 00:38:23

26 dB Emission Bandwidth for GSM(GMSK) Mode, Middle channel



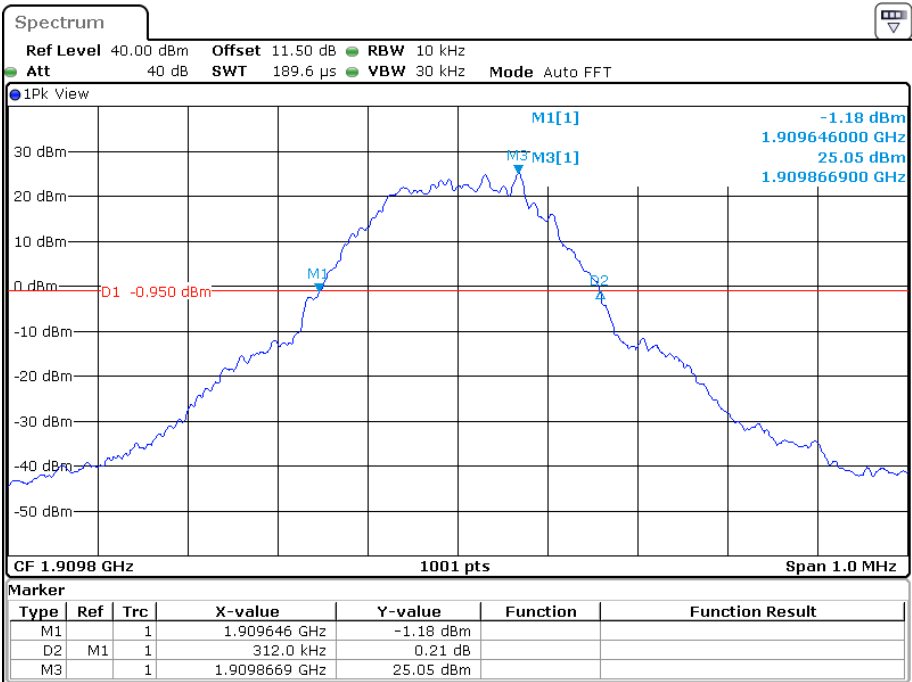
Date: 28.JUN.2023 00:44:58

99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



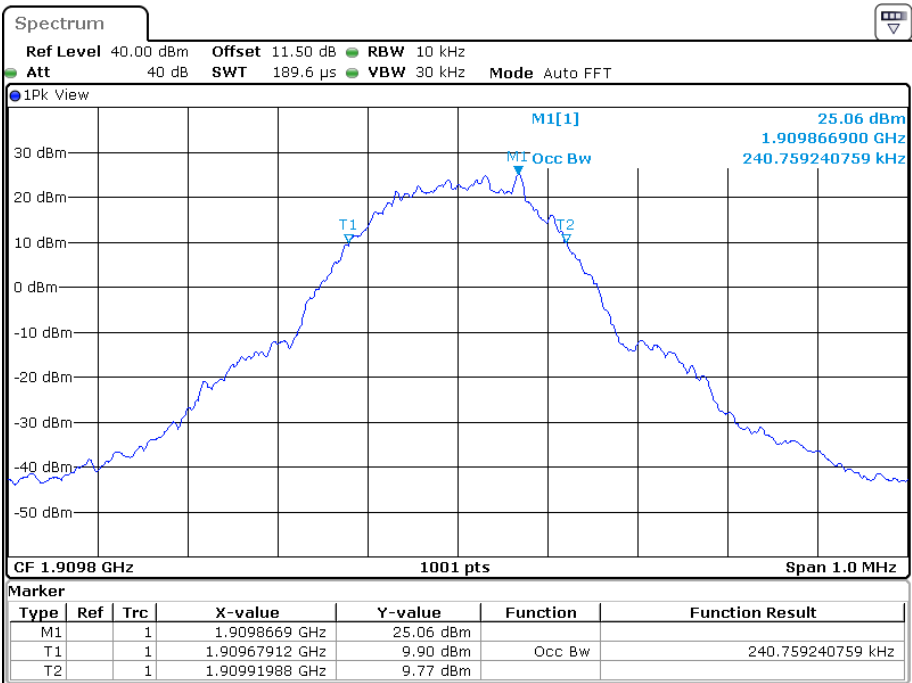
Date: 28.JUN.2023 00:44:28

26 dB Emission Bandwidth for GSM(GMSK) Mode, High channel



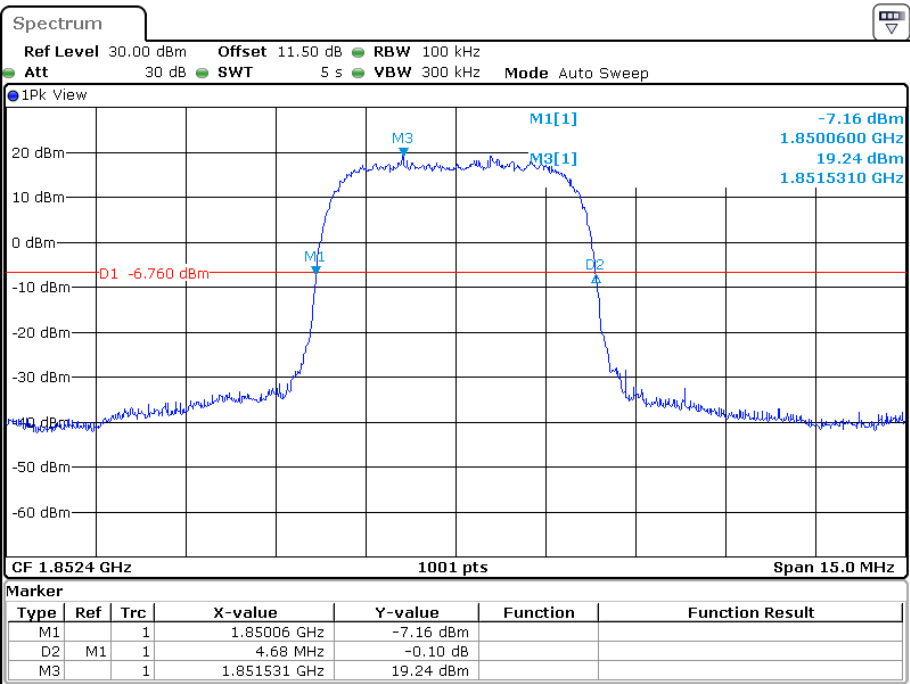
Date: 28.JUN.2023 00:47:53

99% Occupied Bandwidth for GSM(GMSK) Mode, High channel



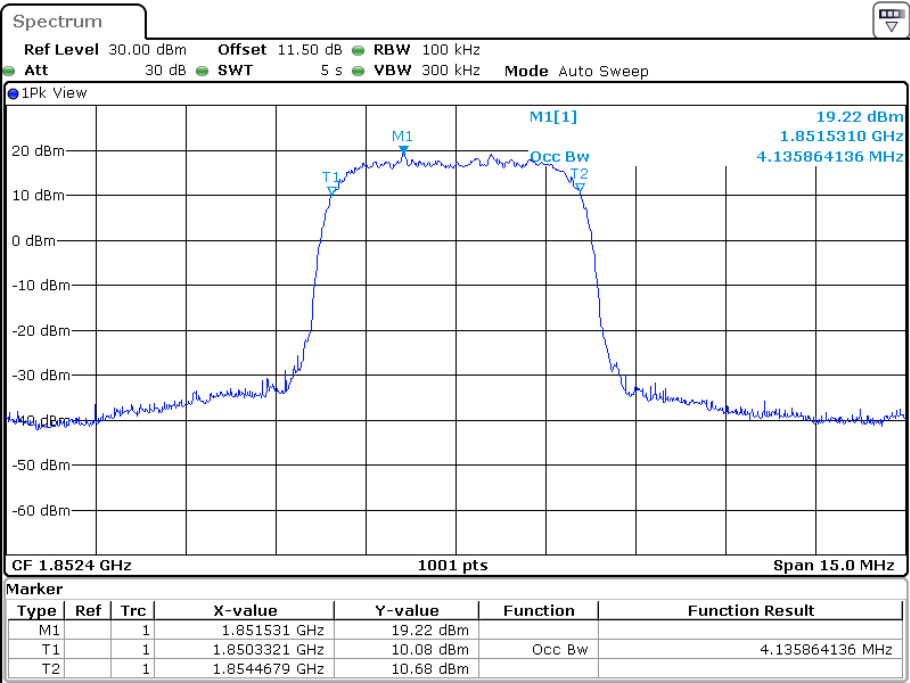
Date: 28.JUN.2023 00:47:31

26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel



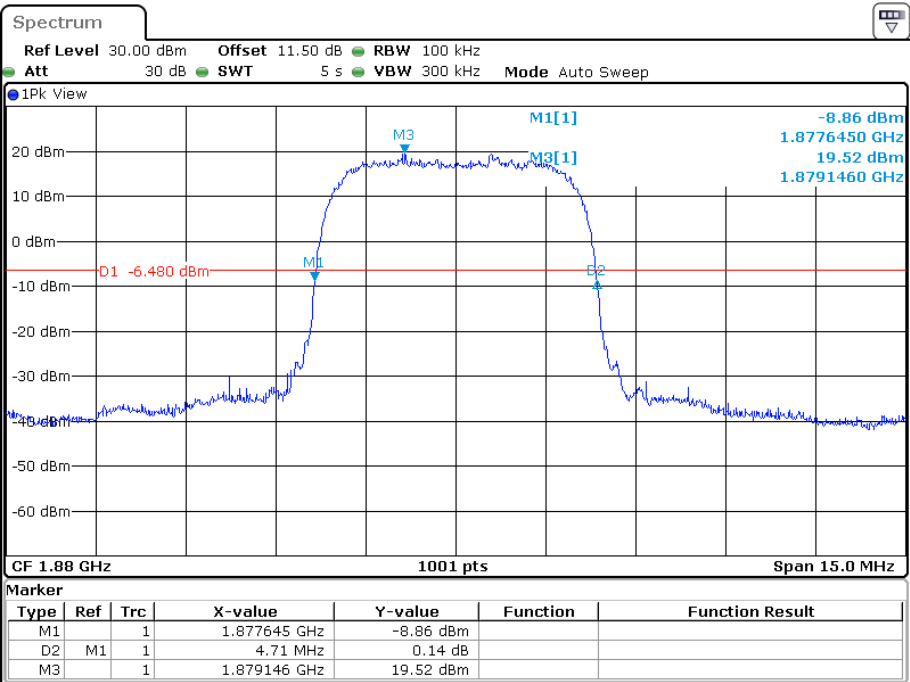
Date: 27.JUN.2023 20:44:49

99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



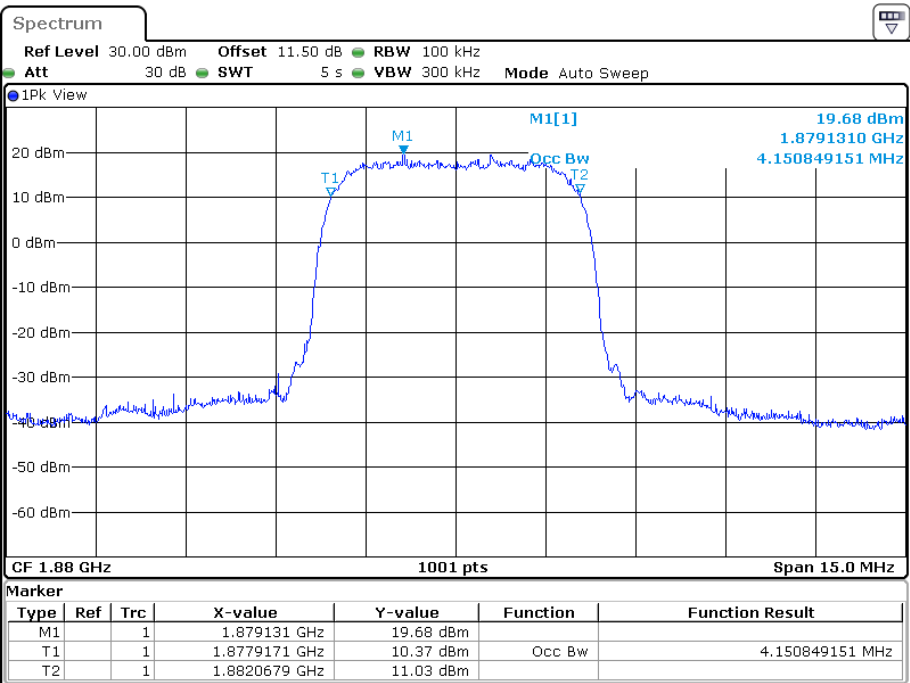
Date: 27.JUN.2023 20:44:20

26 dB Emission Bandwidth for RMC (BPSK) Mode, Middle channel



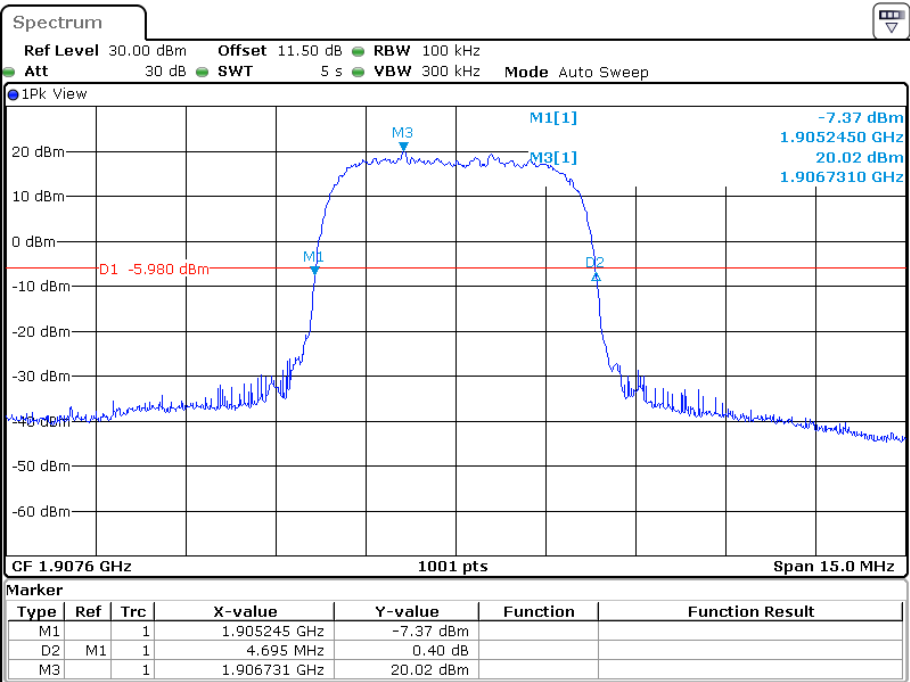
Date: 27.JUN.2023 20:48:18

99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



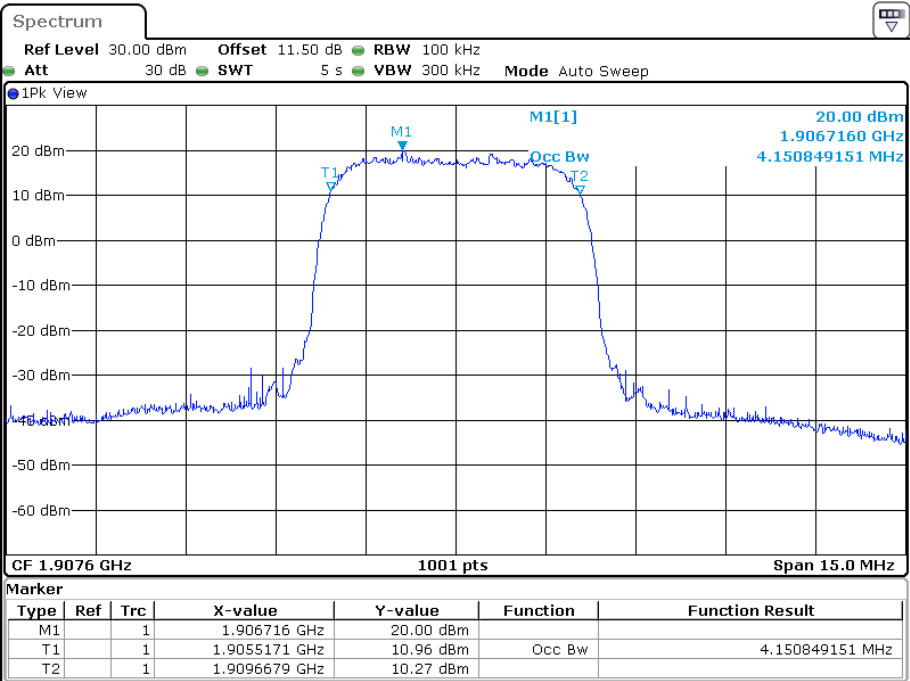
Date: 27.JUN.2023 20:47:51

26 dB Emission Bandwidth for RMC (BPSK) Mode, High channel



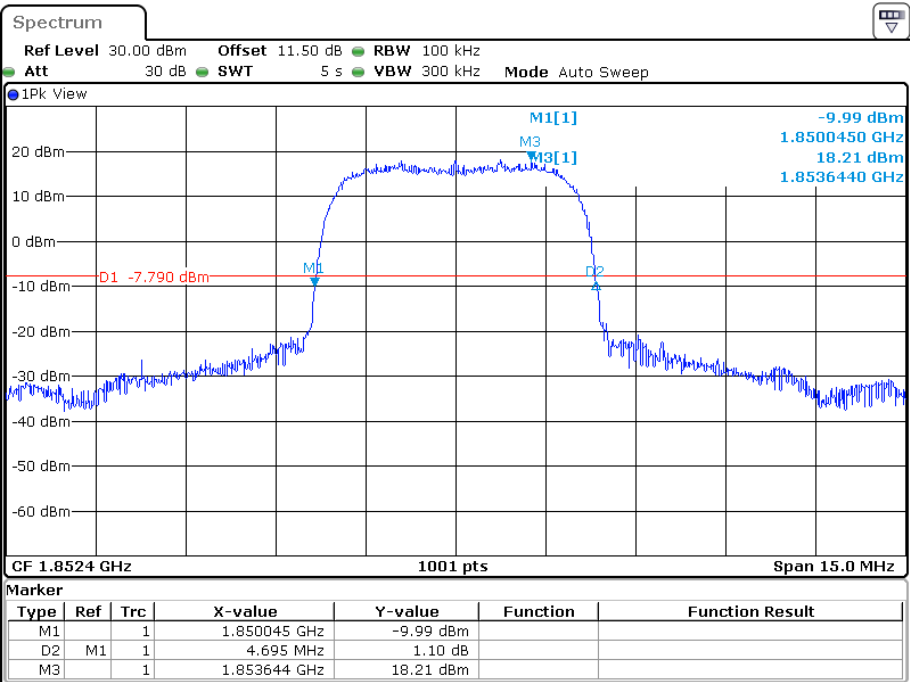
Date: 27.JUN.2023 20:52:29

99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



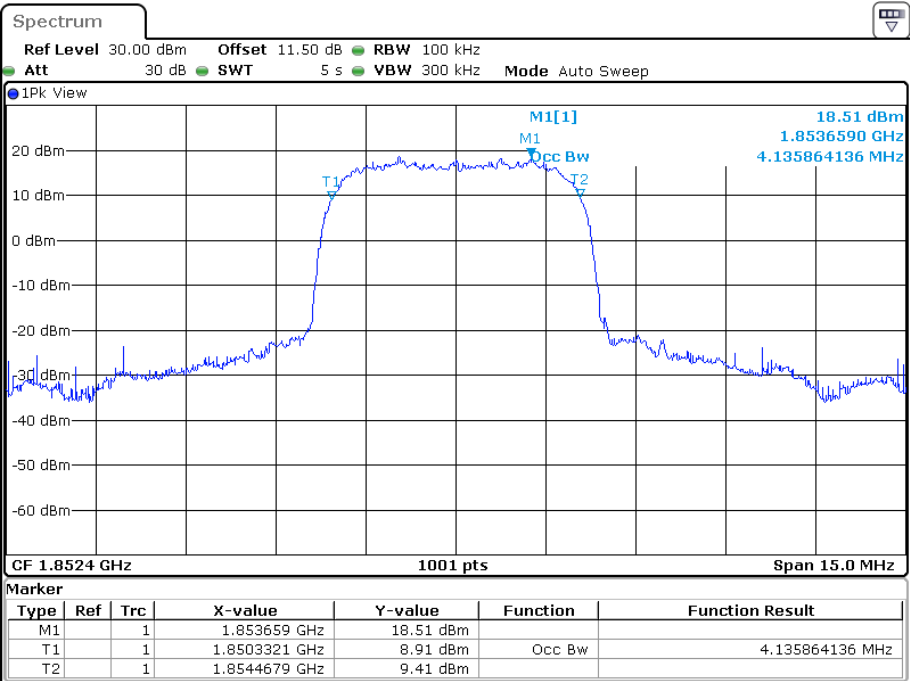
Date: 27.JUN.2023 20:51:01

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Low channel



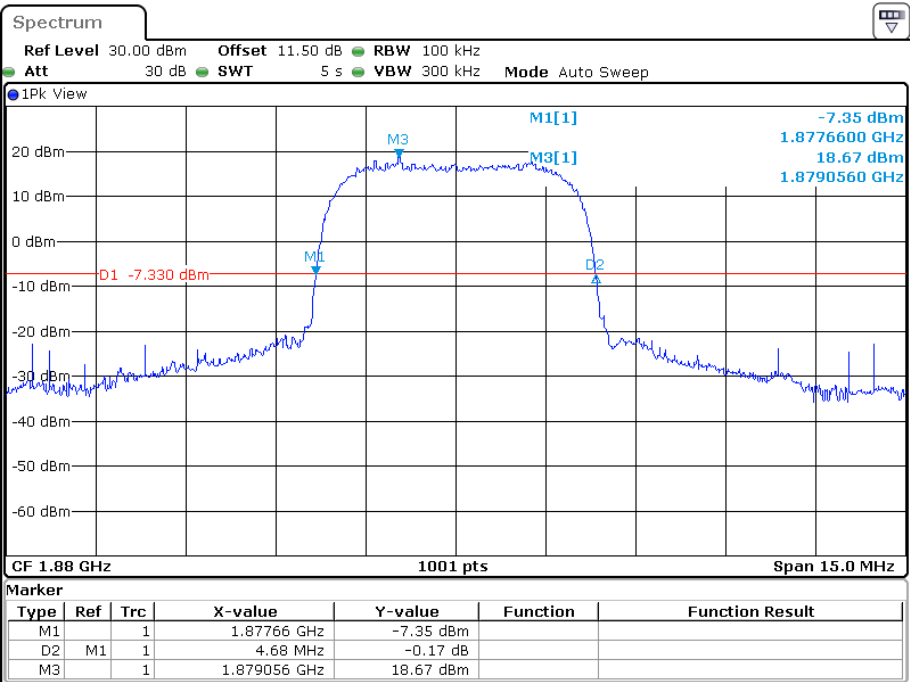
Date: 27.JUN.2023 22:27:13

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel



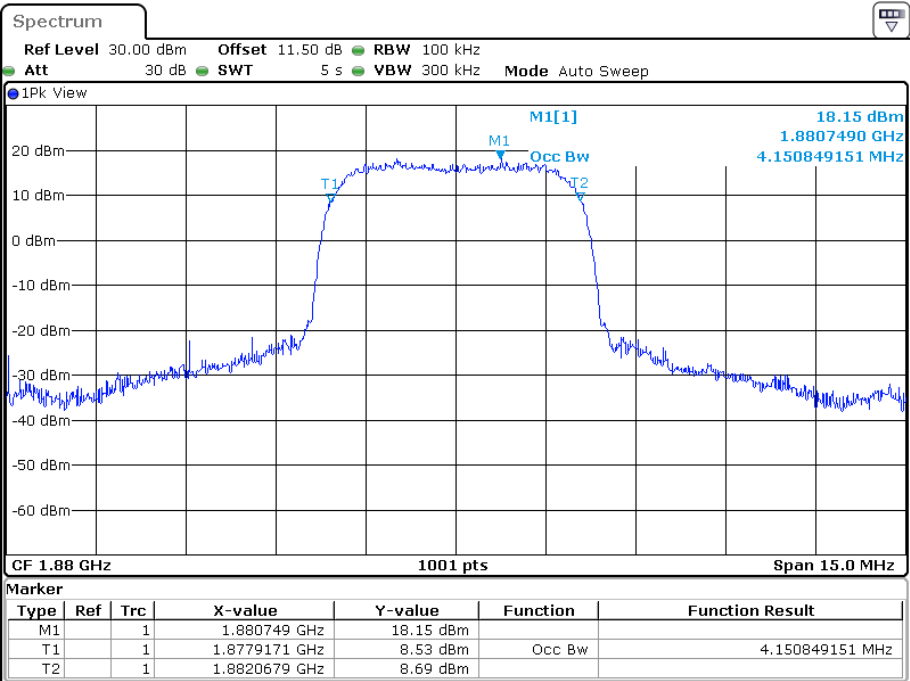
Date: 27.JUN.2023 22:26:50

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Middle channel



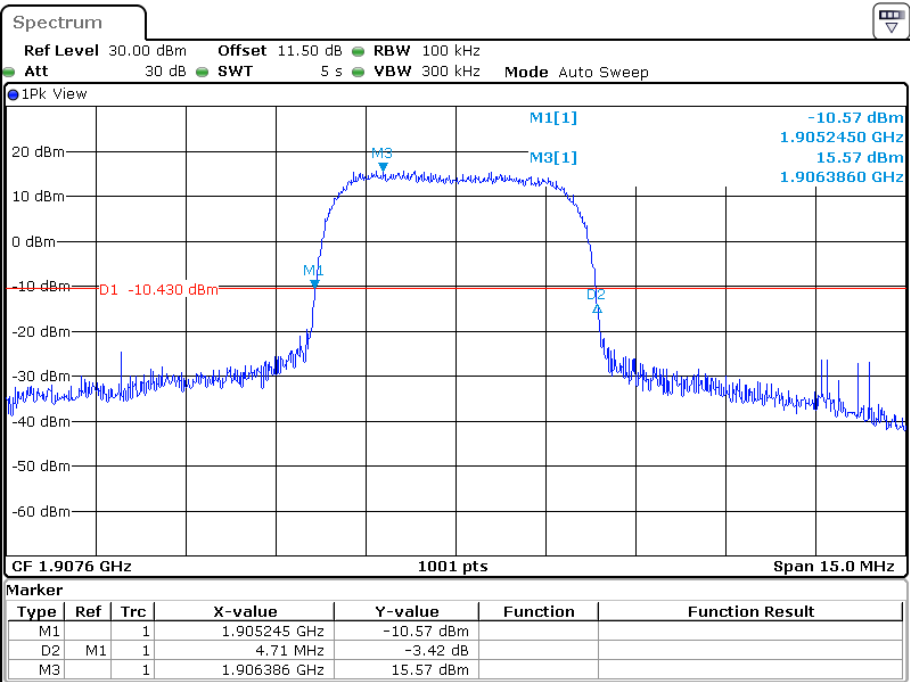
Date: 27.JUN.2023 22:22:39

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel



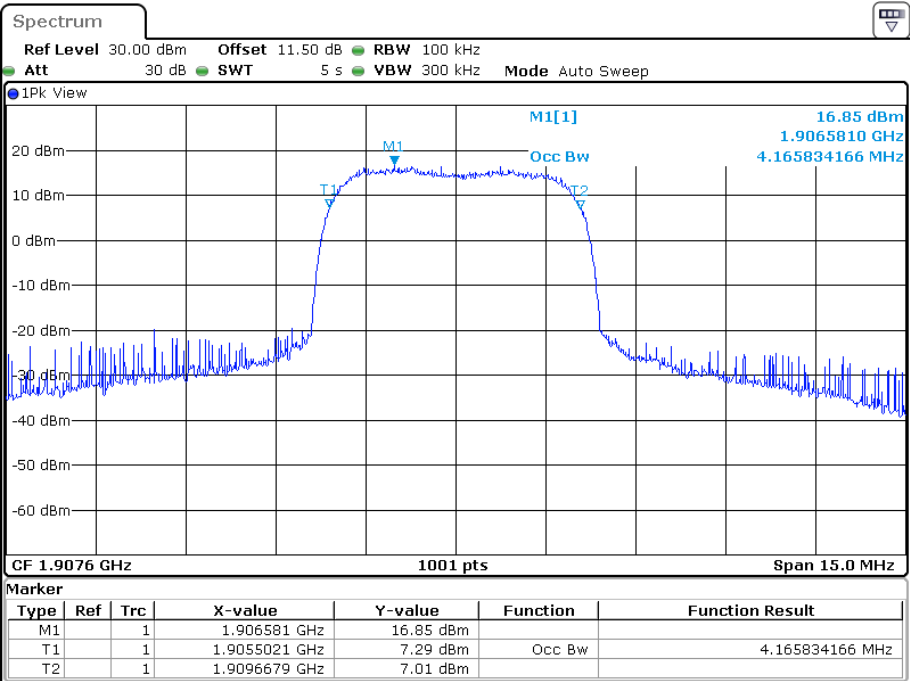
Date: 27.JUN.2023 22:21:56

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel



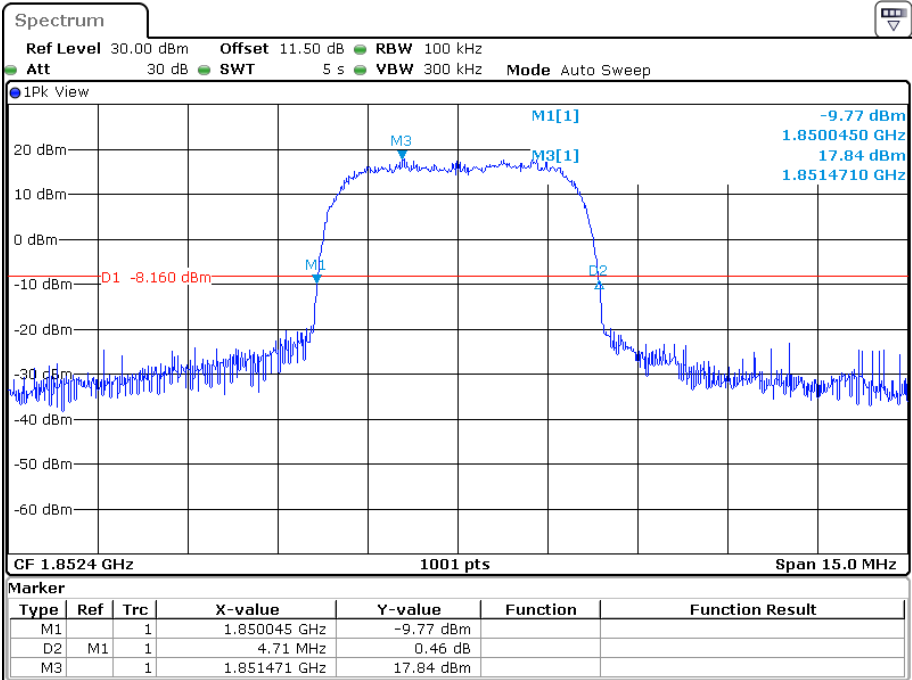
Date: 27.JUN.2023 22:19:15

99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel



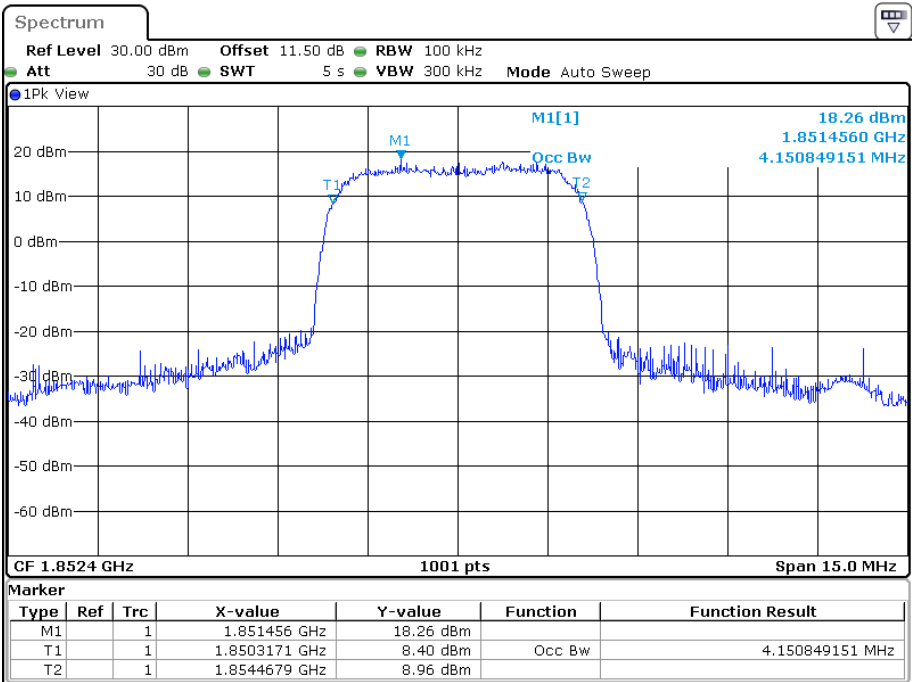
Date: 27.JUN.2023 22:18:52

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Low channel



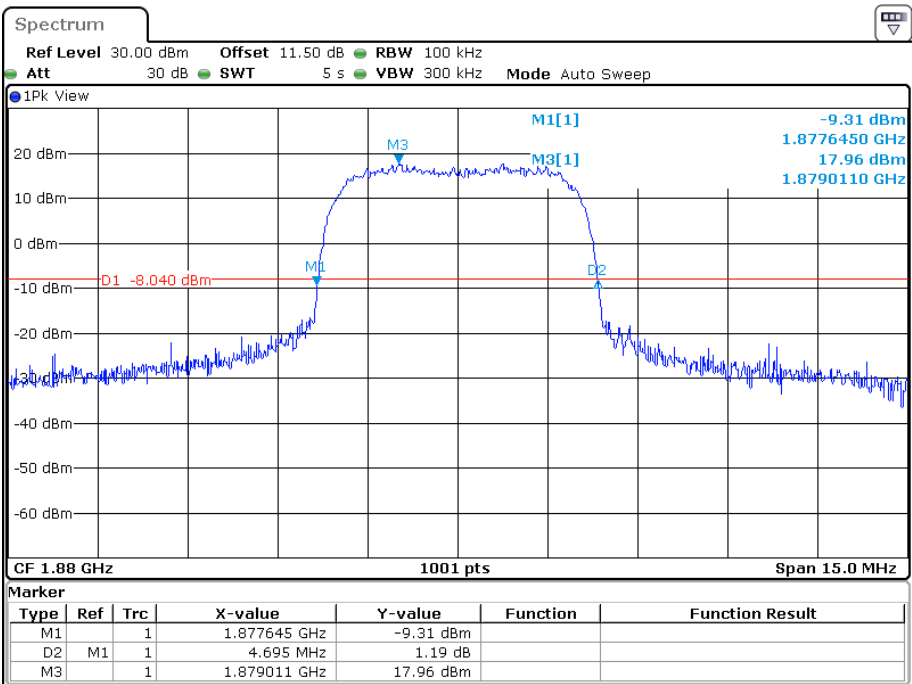
Date: 27.JUN.2023 22:06:06

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



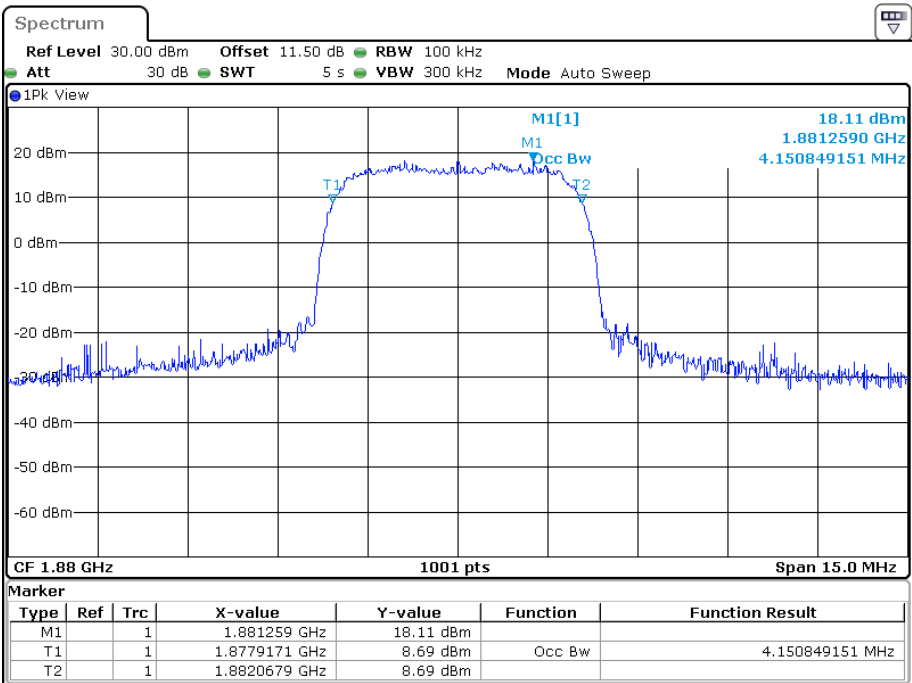
Date: 27.JUN.2023 22:05:36

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Middle channel



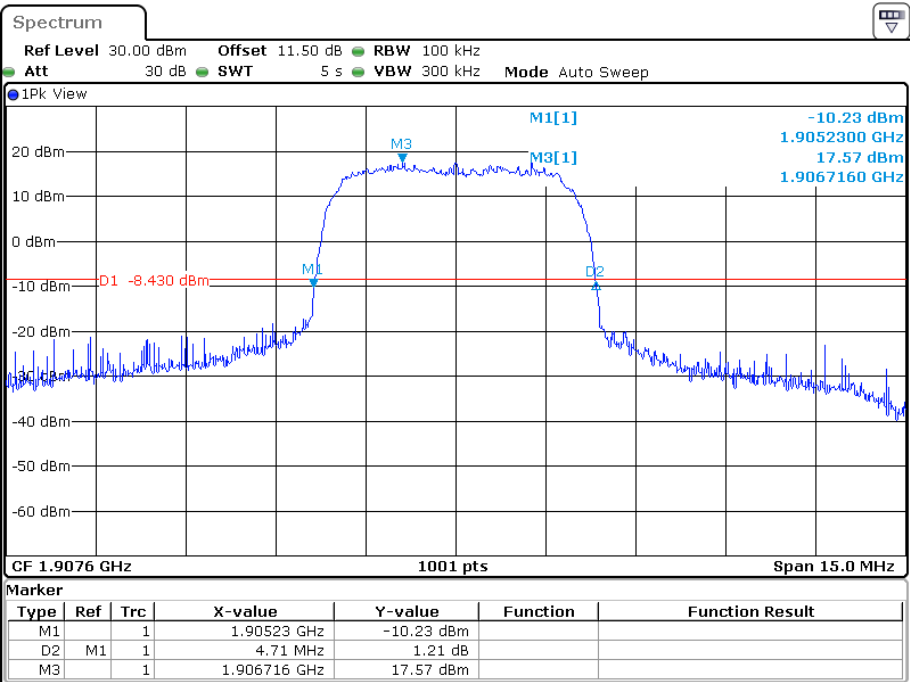
Date: 27.JUN.2023 22:09:15

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



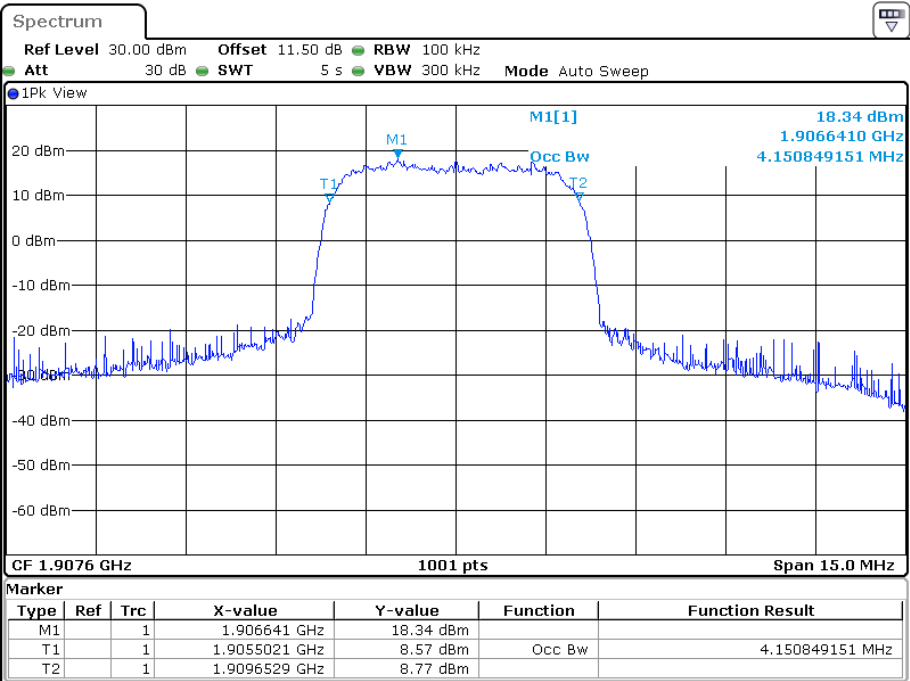
Date: 27.JUN.2023 22:08:45

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 27.JUN.2023 22:12:47

99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 27.JUN.2023 22:12:11

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.102	1.260	1.096	1.260	1.096	1.254
	16QAM	1.102	1.254	1.102	1.260	1.096	1.254
3 MHz	QPSK	2.695	3.012	2.683	3.000	2.695	2.988
	16QAM	2.683	3.000	2.695	3.024	2.695	3.024
5 MHz	QPSK	4.511	5.000	4.511	5.000	4.531	4.980
	16QAM	4.531	5.020	4.531	5.040	4.511	4.980
10 MHz	QPSK	8.942	9.720	8.942	9.800	8.942	9.680
	16QAM	8.982	9.800	8.982	9.880	8.942	9.800
15 MHz	QPSK	13.473	15.000	13.533	14.880	13.473	15.000
	16QAM	13.533	15.000	13.533	15.000	13.473	14.820
20 MHz	QPSK	17.964	19.440	17.964	19.760	17.964	19.440
	16QAM	17.964	19.680	18.044	19.600	17.964	19.440

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.096	1.248	1.096	1.254	1.096	1.266
	16QAM	1.102	1.260	1.102	1.260	1.096	1.248
3 MHz	QPSK	2.695	2.988	2.683	3.012	2.695	3.000
	16QAM	2.683	3.000	2.695	3.024	2.695	3.024
5 MHz	QPSK	4.511	5.000	4.511	4.980	4.531	5.000
	16QAM	4.531	5.020	4.531	5.020	4.511	4.980
10 MHz	QPSK	8.942	9.800	8.942	9.760	8.942	9.760
	16QAM	8.982	9.800	8.942	9.840	8.942	9.720

LTE Band 7:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.511	5.040	4.511	5.020	4.531	5.020
	16QAM	4.531	5.020	4.551	5.060	4.511	5.000
10 MHz	QPSK	8.942	9.760	8.942	9.760	8.982	9.880
	16QAM	8.942	9.840	8.942	9.840	8.942	9.840
15 MHz	QPSK	13.473	15.000	13.533	15.060	13.533	15.180
	16QAM	13.533	15.060	13.533	15.000	13.533	15.060
20 MHz	QPSK	17.964	19.600	17.964	19.760	18.044	19.600
	16QAM	18.044	19.760	17.964	19.840	18.044	19.840

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.102	1.254	1.102	1.254	1.096	1.254
	16QAM	1.096	1.248	1.102	1.254	1.108	1.260
3 MHz	QPSK	2.695	3.000	2.683	3.012	2.707	3.000
	16QAM	2.683	2.976	2.695	3.024	2.683	3.012
5 MHz	QPSK	4.511	5.000	4.511	5.000	4.511	4.980
	16QAM	4.511	5.000	4.531	5.020	4.491	4.980
10 MHz	QPSK	8.942	9.680	9.022	9.840	8.942	9.760
	16QAM	8.942	9.800	9.022	9.880	8.942	9.720

LTE Band 41:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.491	5.040	4.491	5.020	4.511	5.000
	16QAM	4.511	5.000	4.511	5.040	4.491	5.060
10 MHz	QPSK	8.982	9.840	8.942	9.720	8.942	9.840
	16QAM	8.942	9.840	8.942	9.840	8.942	9.800
15 MHz	QPSK	13.473	14.940	13.533	15.180	13.533	14.940
	16QAM	13.593	19.140	13.533	14.940	13.533	15.060
20 MHz	QPSK	17.964	19.600	17.964	19.600	17.964	19.440
	16QAM	18.044	19.680	17.964	19.600	17.964	19.600

The test plots of LTE band please refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a)& §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

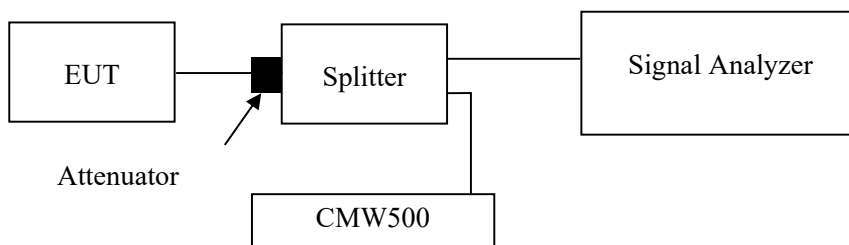
FCC §2.1051, §22.917(a) & §24.238(a)&§27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

ANSI C63.26-2015 Section 5.7

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



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range was added into plots.

Test Data

Environmental Conditions

Temperature:	24.9~26 °C
Relative Humidity:	46~54 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-06-26 to 2023-06-30.

EUT operation mode: Transmitting

Test result: Pass

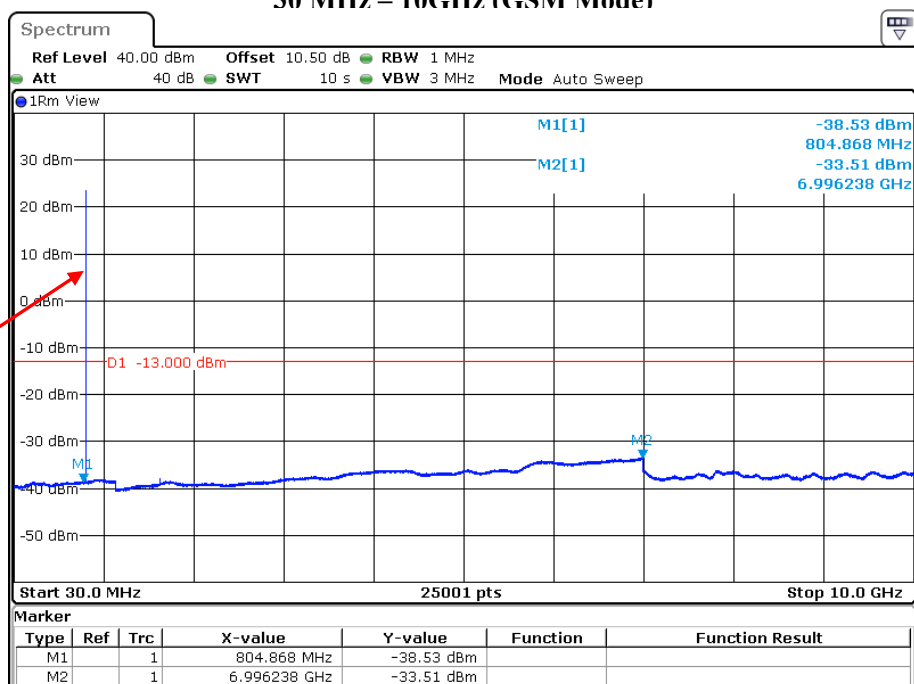
Please refer to the following plots.

Cellular Band

Low Channel:

30 MHz – 10GHz (GSM Mode)

Fundamental test

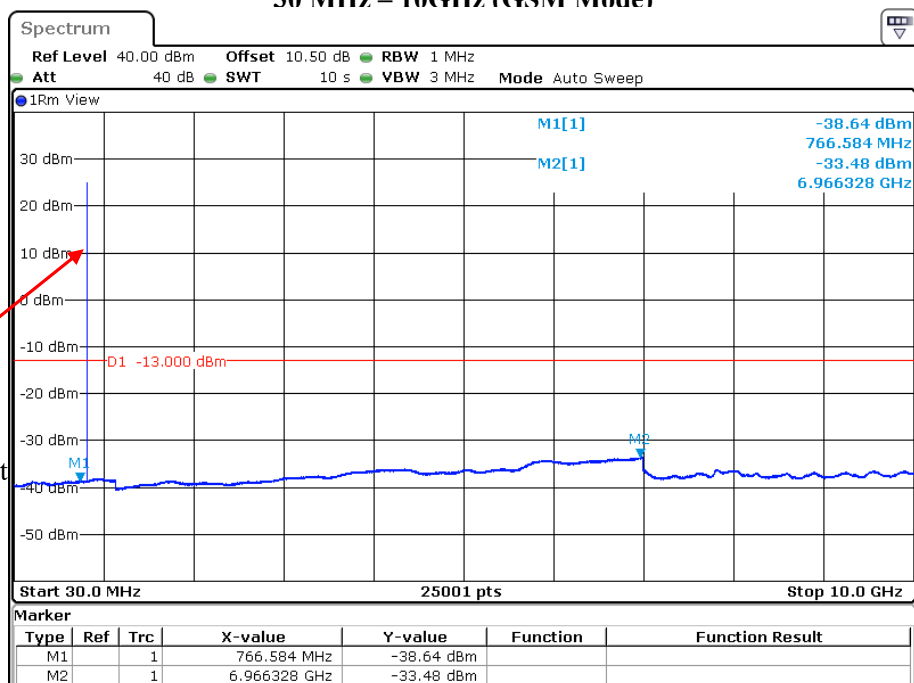


Date: 28.JUN.2023 00:25:12

Middle Channel:

30 MHz – 10GHz (GSM Mode)

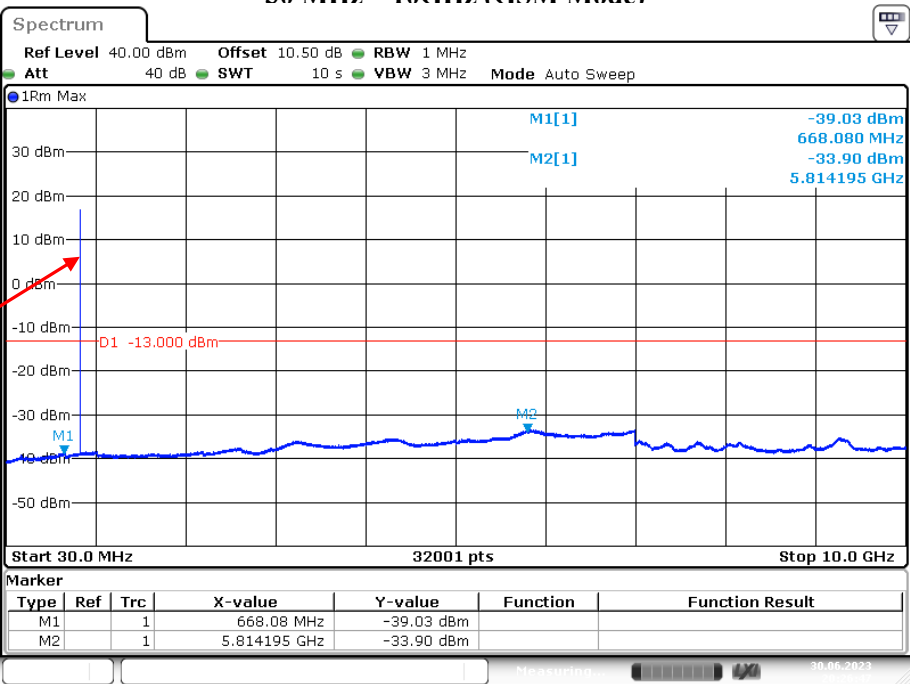
Fundamental test



Date: 28.JUN.2023 00:29:04

High Channel:

30 MHz – 10GHz (GSM Mode)

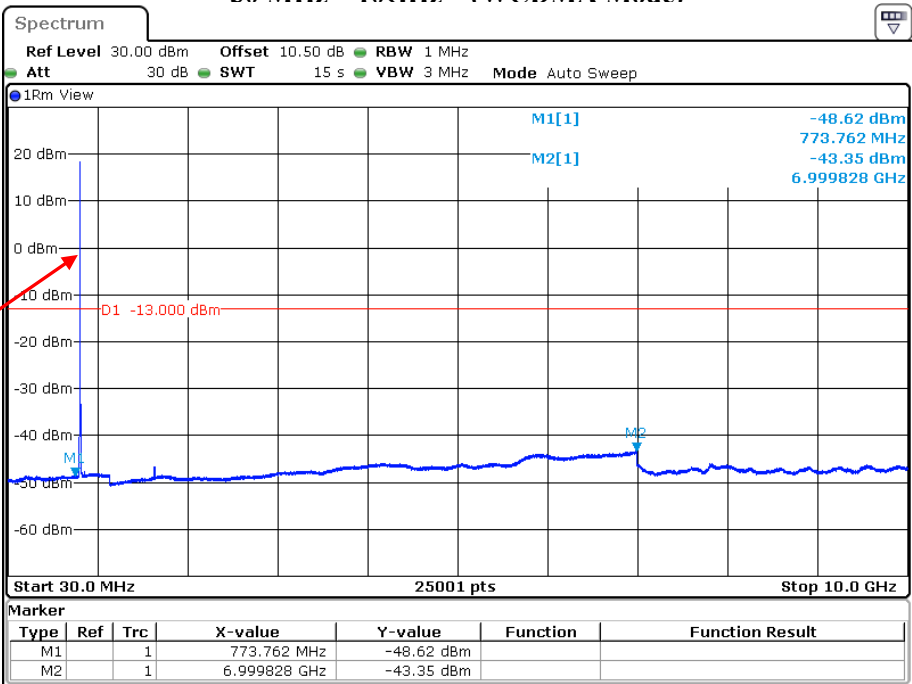


Fundamental test

Date: 30.JUN.2023 20:26:47

Low Channel:

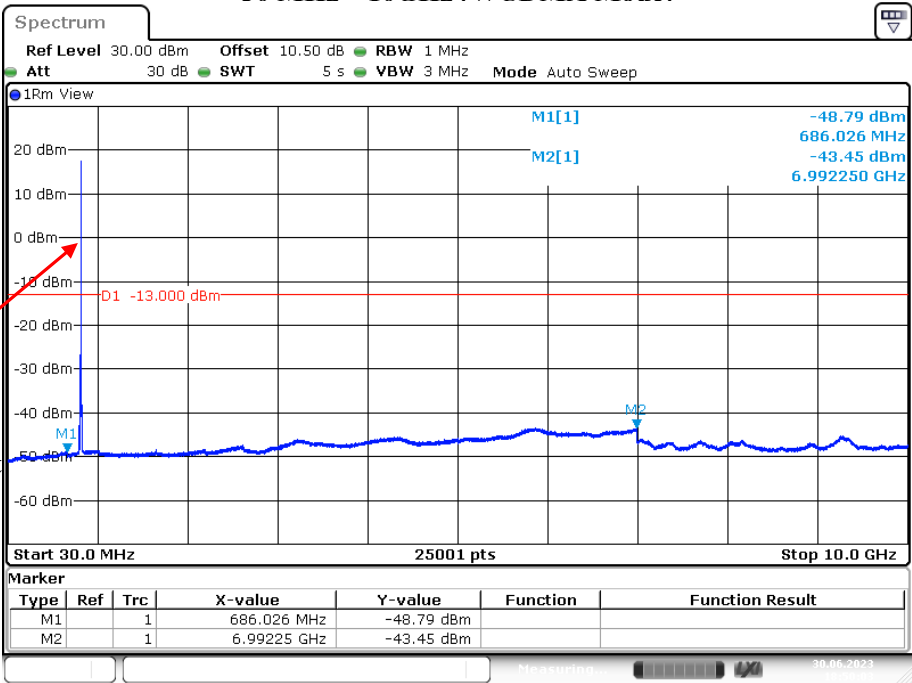
30 MHz – 10GHz (WCDMA Mode)



Date: 27.JUN.2023 22:57:16

Middle Channel:

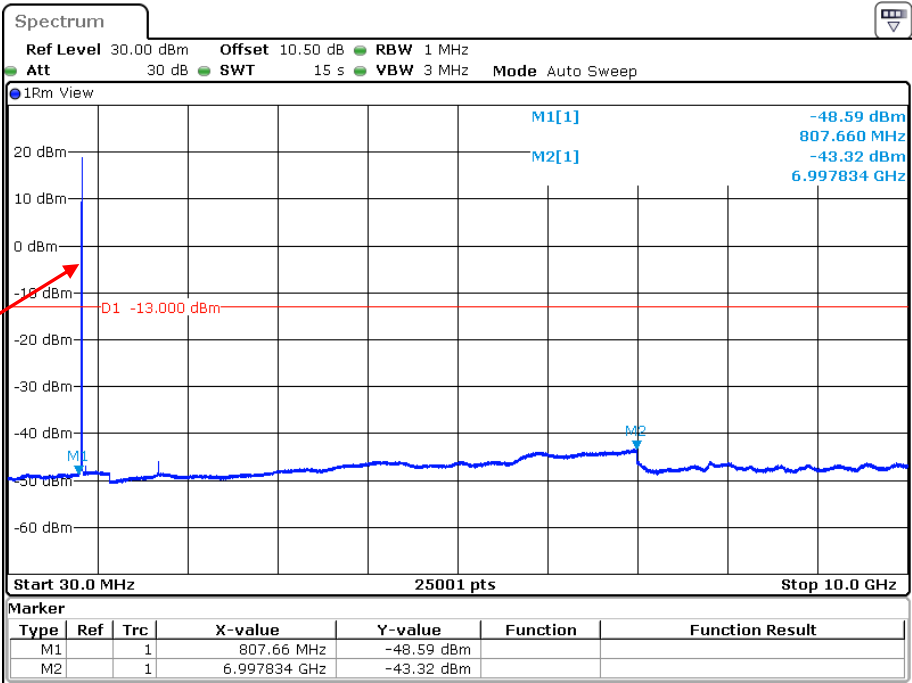
30 MHz – 10GHz (WCDMA Mode)



Date: 30.JUN.2023 18:50:03

High Channel:

30 MHz – 10GHz RMC (WCDMA Mode)



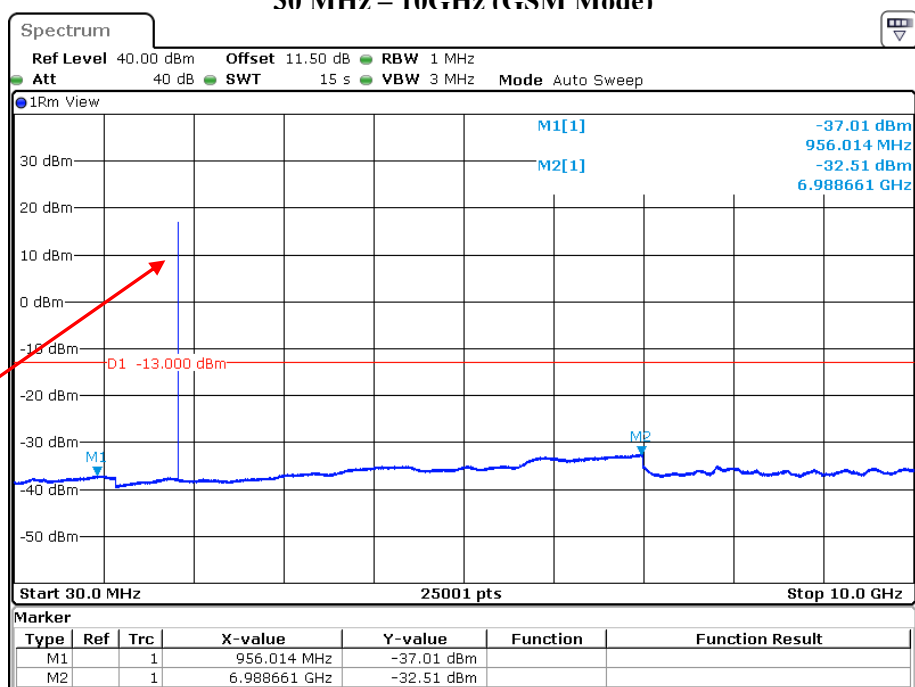
Date: 27.JUN.2023 23:00:17

PCS Band

Low Channel:

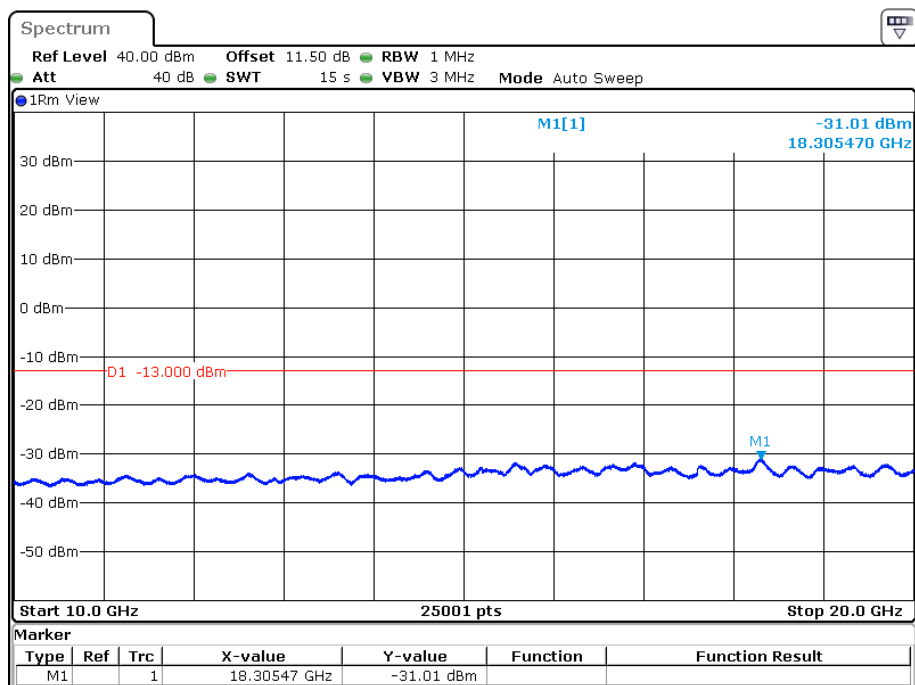
30 MHz – 10GHz (GSM Mode)

Fundamental test



Date: 28.JUN.2023 00:41:43

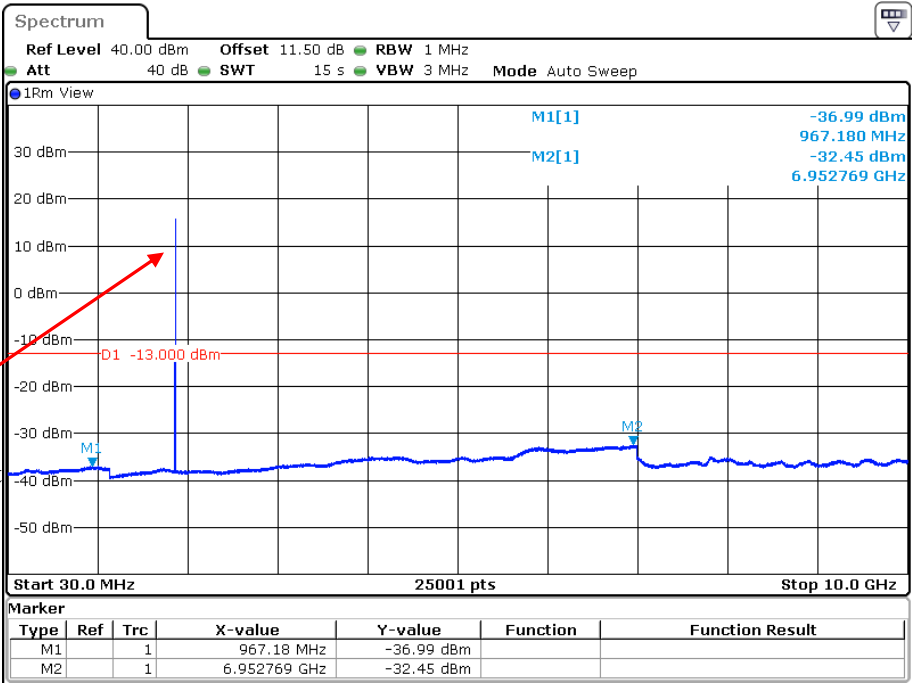
10 GHz – 20GHz (GSM Mode)



Date: 28.JUN.2023 00:42:33

Middle Channel:

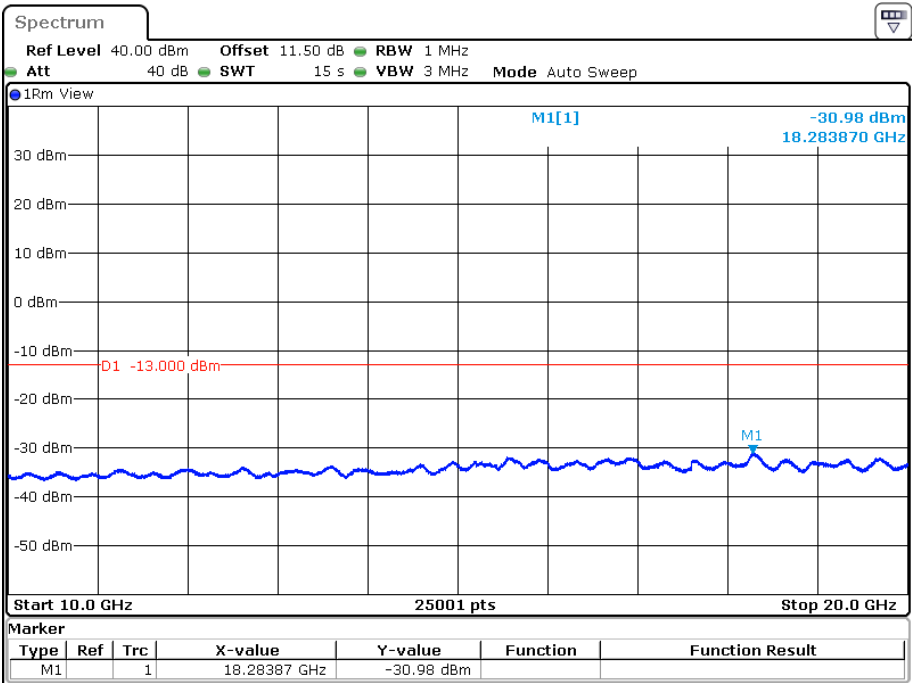
30 MHz – 10GHz (GSM Mode)



Fundamental test

Date: 28.JUN.2023 00:45:50

10 GHz – 20GHz (GSM Mode)

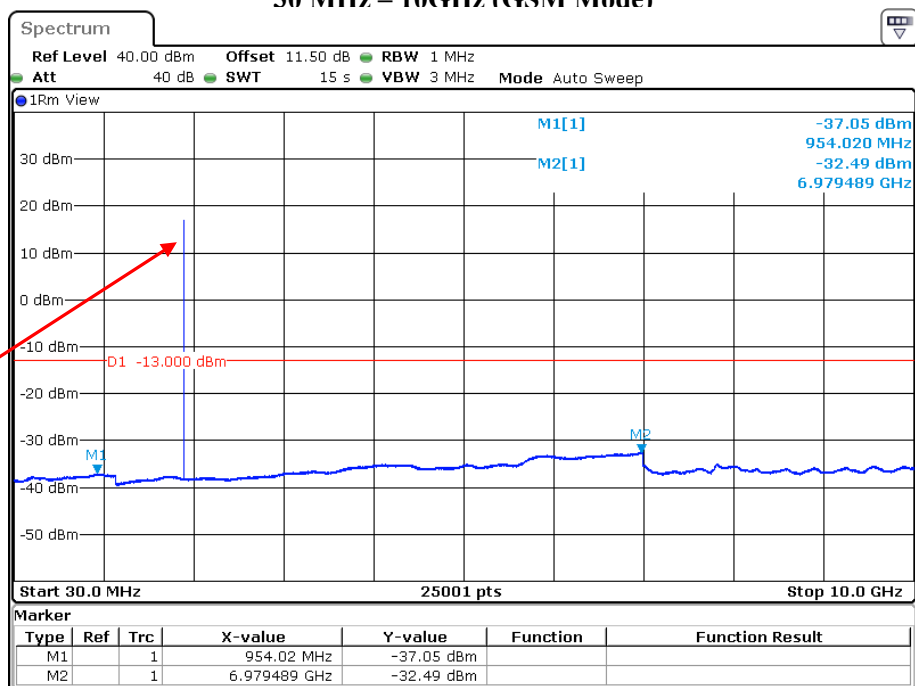


Date: 28.JUN.2023 00:46:30

High Channel:

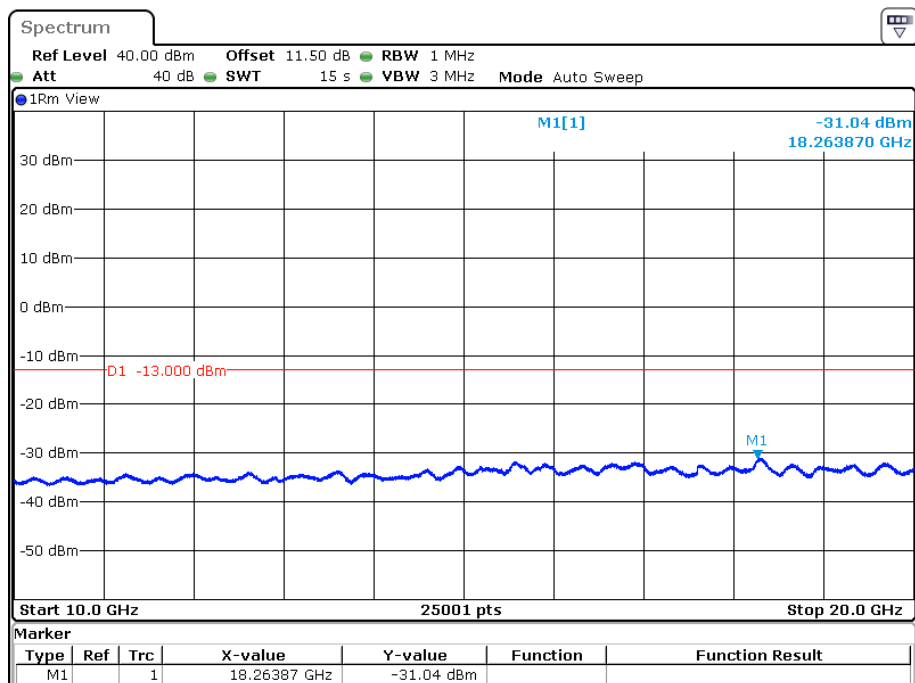
30 MHz – 10GHz (GSM Mode)

Fundamental test



Date: 28.JUN.2023 00:50:43

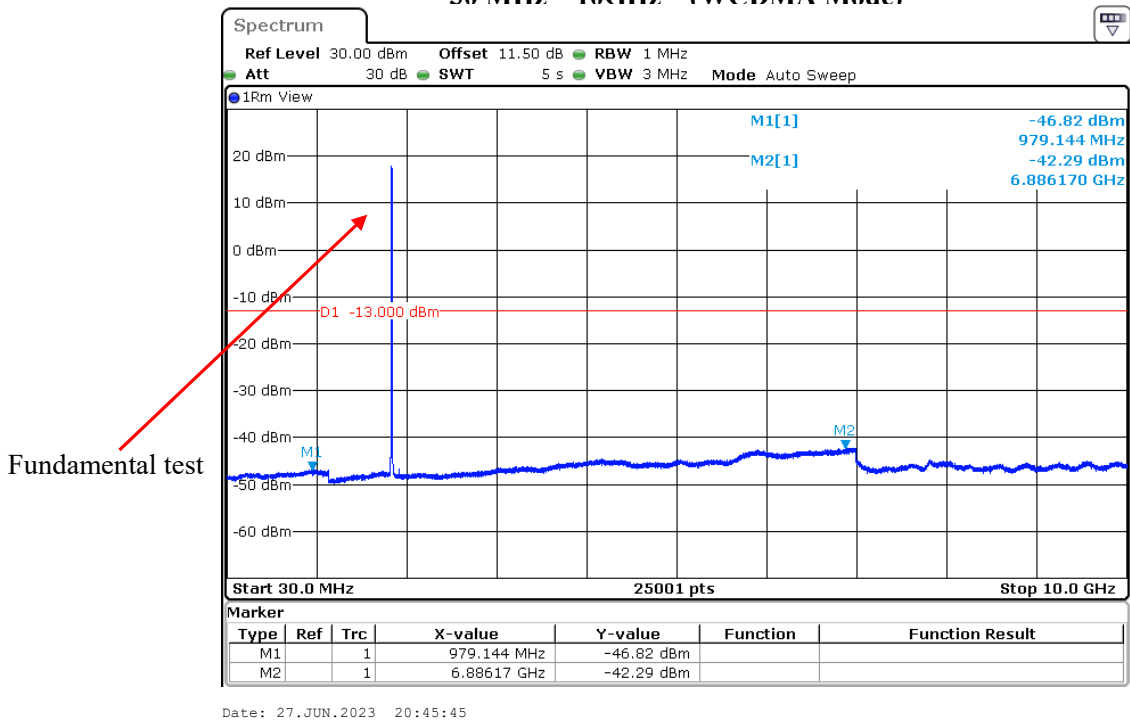
10 GHz – 20GHz (GSM Mode)



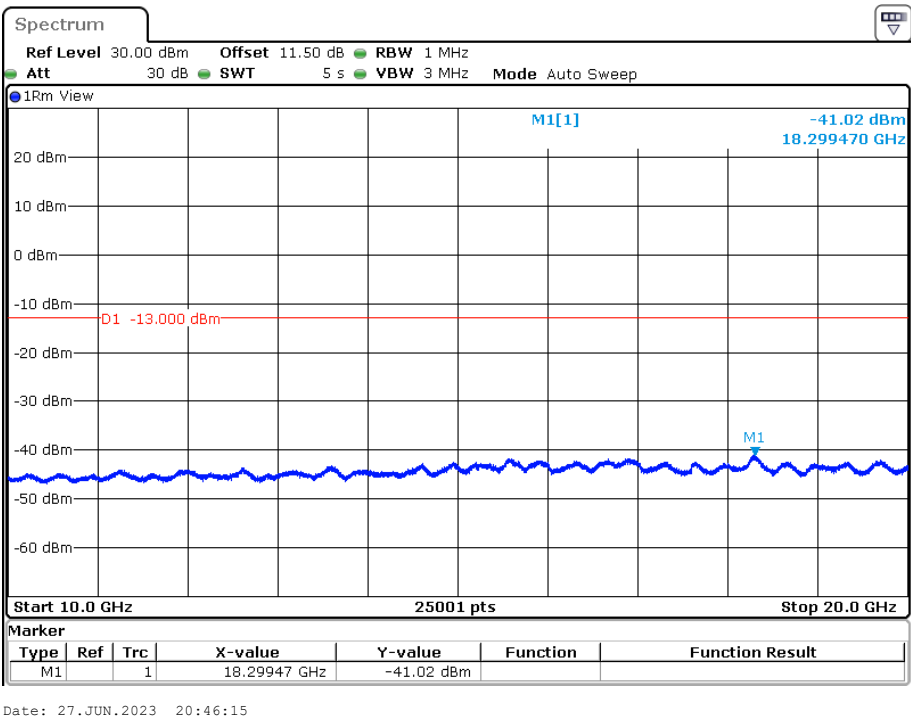
Date: 28.JUN.2023 00:51:17

Low Channel:

30 MHz – 10GHz (WCDMA Mode)

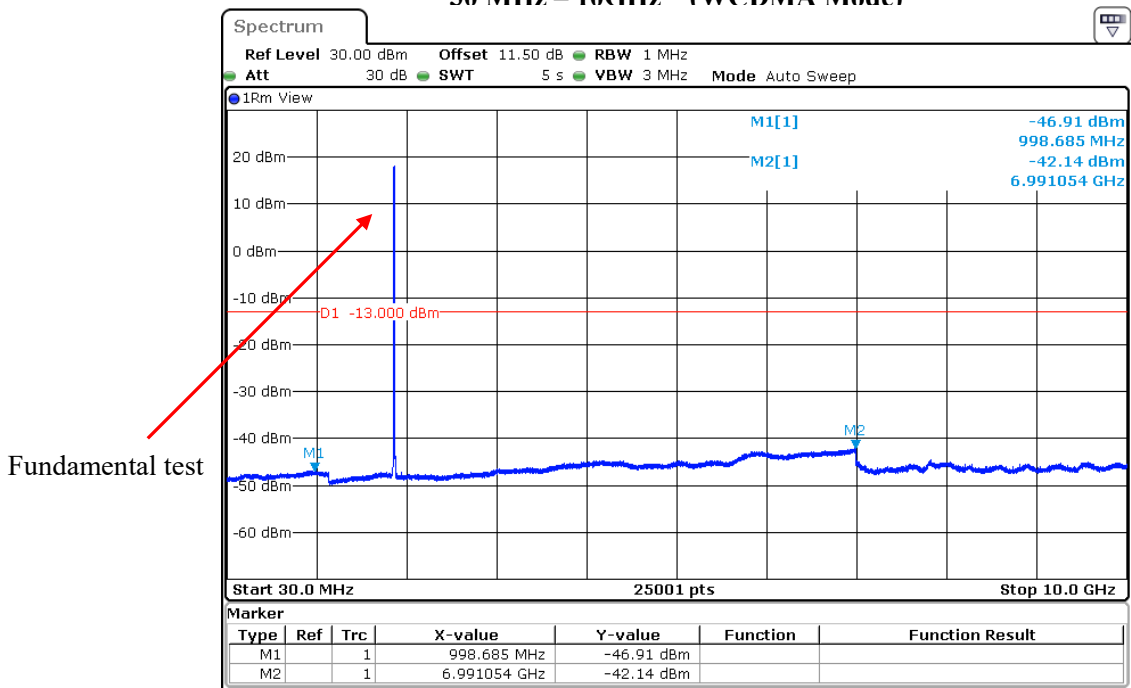


10 GHz – 20GHz (WCDMA Mode)



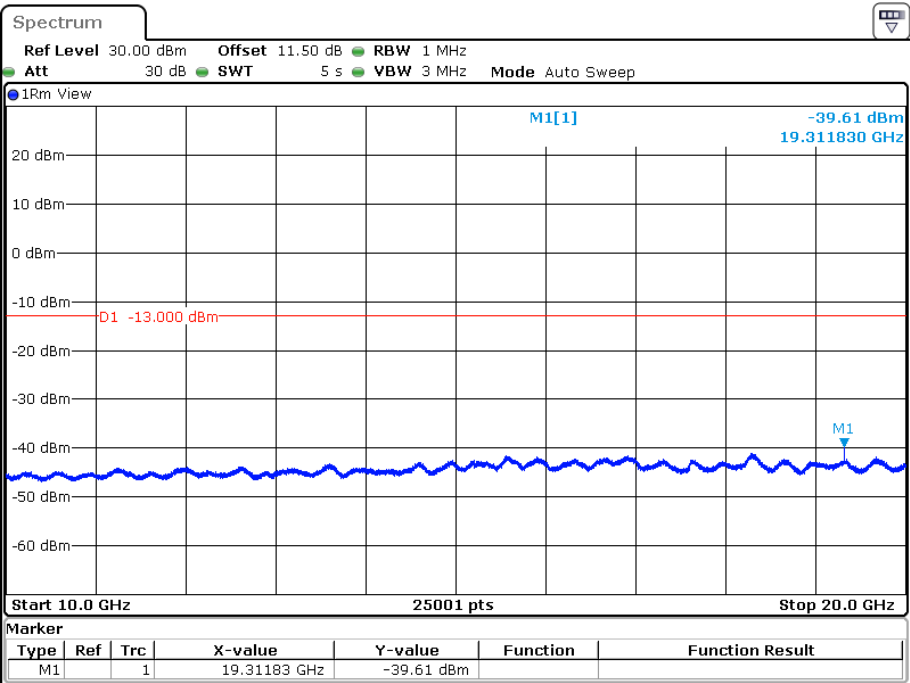
Middle Channel:

30 MHz – 10GHz (WCDMA Mode)



Date: 27.JUN.2023 20:48:46

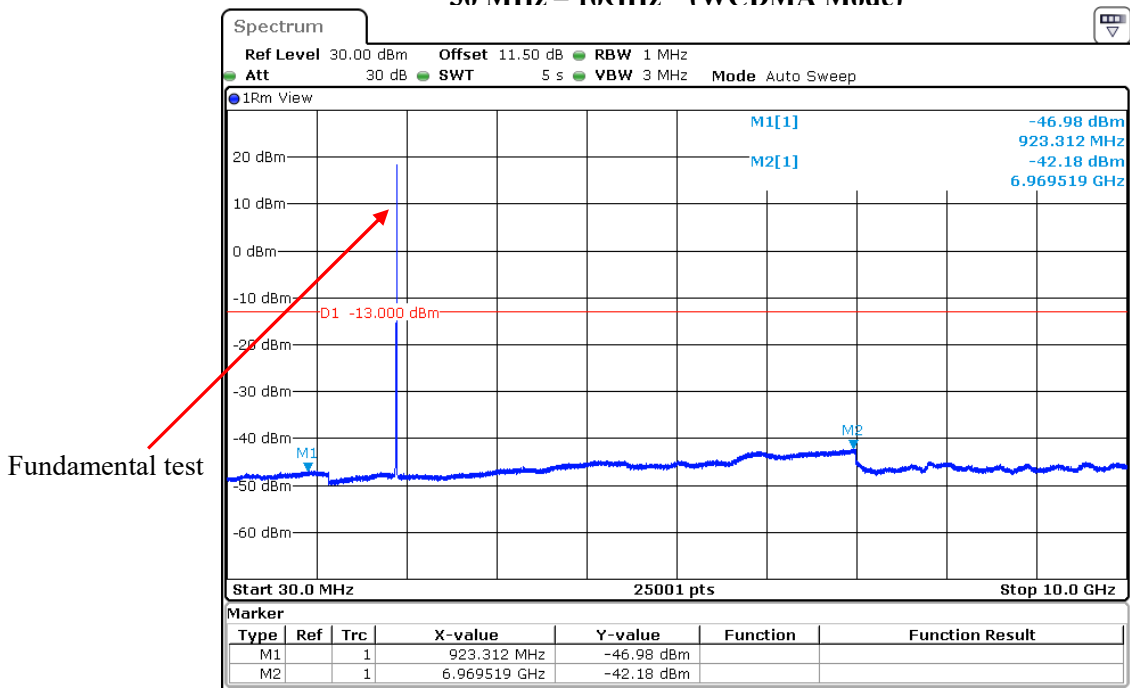
10 GHz – 20GHz (WCDMA Mode)



Date: 27.JUN.2023 20:49:16

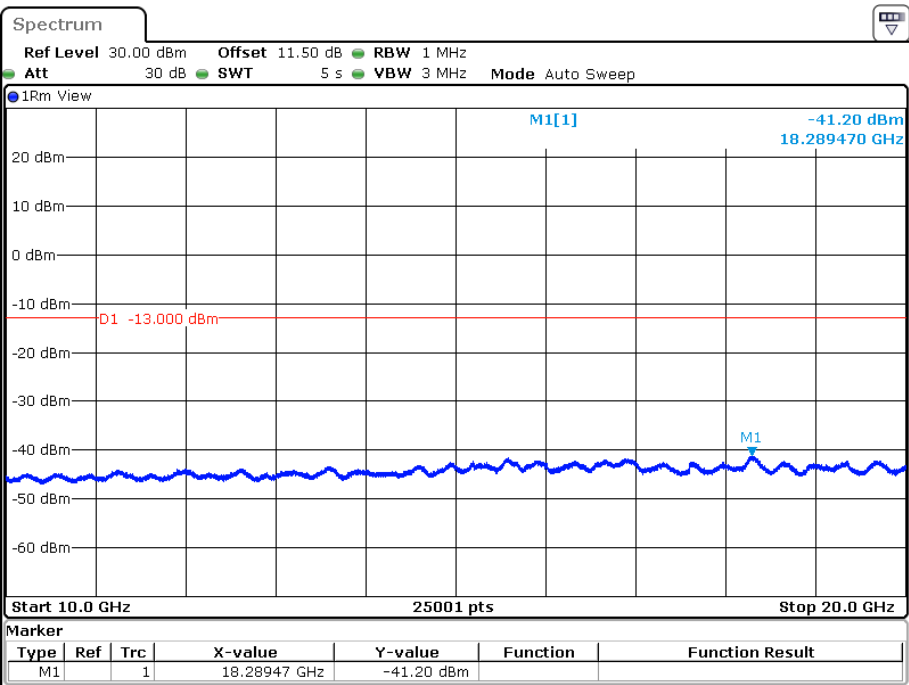
High Channel:

30 MHz – 10GHz (WCDMA Mode)



Date: 27.JUN.2023 20:53:25

10 GHz – 20GHz (WCDMA Mode)



Date: 27.JUN.2023 20:53:56

The test plots of LTE band please refer to the Appendix B.

FCC § 2.1053; § 22.917 (a); § 24.238 (a); § 27.53 - SPURIOUS RADIATED EMISSIONS**Applicable Standard**

FCC § 2.1053, § 22.917(a) & § 24.238(a) & § 27.53.

Test Procedure

ANSI/TIA-603-E-2016 Section 2.2.12
KDB 671168 D01 v03r01 Section 6.2

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data**Environmental Conditions**

Temperature:	24.1~25.5 °C
Relative Humidity:	46~52 %
ATM Pressure:	101.0 kPa

The testing was performed by Jimi Zheng on 2023-06-28~2023-06-30.

EUT operation mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axes of orientation was recorded)

Radiated Emission (Scan with X-AXIS, Y-AXIS, Z-AXIS, the worst case was recorded)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
1648.4	-48.00	225	1.7	H	0.4	-47.60	-13	-34.60
1648.4	-47.30	75	2.1	V	0.1	-47.20	-13	-34.20
2472.6	-32.80	125	2.4	H	3.6	-29.20	-13	-16.20
2472.6	-33.40	131	2.3	V	4.2	-29.20	-13	-16.20
3296.8	-47.30	149	1.4	H	4.1	-43.20	-13	-30.20
3296.8	-47.80	109	2.4	V	4.4	-43.40	-13	-30.40
Middle channel								
1673.2	-43.80	285	1	H	0.5	-43.30	-13	-30.30
1673.2	-44.40	120	1.2	V	0.5	-43.90	-13	-30.90
2509.8	-32.60	269	1.3	H	3.6	-29.00	-13	-16.00
2509.8	-33.20	291	1.6	V	3.9	-29.30	-13	-16.30
3346.4	-44.50	262	2.1	H	4.1	-40.40	-13	-27.40
3346.4	-45.70	228	1.1	V	4.1	-41.60	-13	-28.60
High channel								
1697.6	-31.10	87	1.5	H	0.5	-30.60	-13	-17.60
1697.6	-32.00	170	1.7	V	0.9	-31.10	-13	-18.10
2546.4	-32.20	282	1.8	H	3.5	-28.70	-13	-15.70
2546.4	-33.30	283	2.2	V	3.8	-29.50	-13	-16.50
3395.2	-41.20	30	1.7	H	4.5	-36.70	-13	-23.70
3395.2	-42.10	228	1.9	V	5.1	-37.00	-13	-24.00

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
3700.4	-47.70	254	2.1	H	5.9	-41.80	-13	-28.80
3700.4	-47.20	293	1.9	V	6.4	-40.80	-13	-27.80
5550.6	-50.40	252	2.3	H	9.1	-41.30	-13	-28.30
5550.6	-49.80	137	1.2	V	9.5	-40.30	-13	-27.30
Middle channel								
3760.0	-41.90	260	1.8	H	6.2	-35.70	-13	-22.70
3760.0	-40.50	52	2.4	V	6.7	-33.80	-13	-20.80
5640.0	-49.90	23	1.4	H	9.1	-40.80	-13	-27.80
5640.0	-49.30	215	1.6	V	9.3	-40.00	-13	-27.00
High channel								
3819.6	-37.30	228	1.4	H	6.1	-31.20	-13	-18.20
3819.6	-36.60	323	1.5	V	6.4	-30.20	-13	-17.20
5729.4	-49.80	100	1.6	H	9.1	-40.70	-13	-27.70
5729.4	-49.10	2	2.5	V	9.5	-39.60	-13	-26.60

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band 2								
Test frequency range: 30MHz-20GHz								
Low channel								
3704.8	-51.40	253	2.1	H	5.9	-45.50	-13	-32.50
3704.8	-51.50	352	1	V	6.4	-45.10	-13	-32.10
5557.2	-53.30	250	1.1	H	9.1	-44.20	-13	-31.20
5557.2	-53.60	97	1.3	V	9.5	-44.10	-13	-31.10
Middle channel								
3760.0	-50.10	153	2.3	H	6.2	-43.90	-13	-30.90
3760.0	-51.80	139	1.7	V	6.7	-45.10	-13	-32.10
5640.0	-52.50	40	1.1	H	9.1	-43.40	-13	-30.40
5640.0	-52.60	170	1.7	V	9.3	-43.30	-13	-30.30
High channel								
3815.2	-49.80	114	1.7	H	6.2	-43.60	-13	-30.60
3815.2	-48.20	234	2.5	V	6.4	-41.80	-13	-28.80
5722.8	-51.90	177	1.8	H	9.1	-42.80	-13	-29.80
5722.8	-52.00	190	1.6	V	9.5	-42.50	-13	-29.50

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band 5								
Test frequency range: 30MHz-10GHz								
Low channel								
1652.8	-32.90	47	1.7	H	0.4	-32.50	-13	-19.50
1652.8	-34.30	24	1.4	V	0.2	-34.10	-13	-21.10
2479.2	-36.20	293	2.5	H	3.6	-32.60	-13	-19.60
2479.2	-39.40	323	2.4	V	4.1	-35.30	-13	-22.30
3305.6	-45.90	52	2	H	4.1	-41.80	-13	-28.80
3305.6	-46.60	223	1.3	V	4.3	-42.30	-13	-29.30
Middle channel								
1673.2	-31.80	208	2.5	H	0.5	-31.30	-13	-18.30
1673.2	-33.60	213	2	V	0.5	-33.10	-13	-20.10
2509.8	-37.50	359	2.2	H	3.6	-33.90	-13	-20.90
2509.8	-40.90	166	1.1	V	3.9	-37.00	-13	-24.00
3346.4	-45.60	259	2.4	H	4.1	-41.50	-13	-28.50
3346.4	-46.00	248	1.2	V	4.1	-41.90	-13	-28.90
High channel								
1693.2	-30.90	356	1.9	H	0.5	-30.40	-13	-17.40
1693.2	-32.50	64	1.4	V	0.9	-31.60	-13	-18.60
2539.8	-35.40	225	1.1	H	3.5	-31.90	-13	-18.90
2539.8	-37.90	300	2.1	V	3.8	-34.10	-13	-21.10
3386.4	-45.10	354	1.6	H	4.4	-40.70	-13	-27.70
3386.4	-45.90	252	1.6	V	4.9	-41.00	-13	-28.00

LTE Bands: (pre-scan QPSK & 16QAM with all bandwidths, the worst case as below)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 2								
Test frequency range: 30MHz-20GHz								
QPSK 1.4MHz Bandwidth, Low channel								
3701.4	-49.10	28	2	H	5.9	-43.20	-13	-30.20
3701.4	-48.40	323	2.2	V	6.4	-42.00	-13	-29.00
5552.1	-41.30	66	1	H	9.1	-32.20	-13	-19.20
5552.1	-40.80	39	1.1	V	9.5	-31.30	-13	-18.30
QPSK 1.4MHz Bandwidth, Middle channel								
3760.0	-49.20	264	1.6	H	6.2	-43.00	-13	-30.00
3760.0	-48.80	159	1.7	V	6.7	-42.10	-13	-29.10
5640.0	-40.40	162	1	H	9.1	-31.30	-13	-18.30
5640.0	-39.90	26	1.6	V	9.3	-30.60	-13	-17.60
QPSK 1.4MHz Bandwidth, High channel								
3818.6	-48.20	286	1.8	H	6.1	-42.10	-13	-29.10
3818.6	-47.40	196	1.7	V	6.4	-41.00	-13	-28.00
5727.9	-39.60	140	1.2	H	9.1	-30.50	-13	-17.50
5727.9	-38.90	73	1.1	V	9.5	-29.40	-13	-16.40

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1649.4	-30.60	206	1.6	H	0.4	-30.20	-13	-17.20
1649.4	-32.00	314	1.1	V	0.1	-31.90	-13	-18.90
2474.1	-39.80	182	1.9	H	3.6	-36.20	-13	-23.20
2474.1	-41.80	254	1.9	V	4.2	-37.60	-13	-24.60
3298.8	-42.10	43	1.7	H	4.1	-38.00	-13	-25.00
3298.8	-44.80	186	1.8	V	4.3	-40.50	-13	-27.50
QPSK 1.4MHz Bandwidth, Middle channel								
1673.0	-27.50	133	2	H	0.5	-27.00	-13	-14.00
1673.0	-28.20	330	1.1	V	0.5	-27.70	-13	-14.70
2509.5	-39.30	63	2.3	H	3.6	-35.70	-13	-22.70
2509.5	-41.10	33	1.9	V	3.9	-37.20	-13	-24.20
3346.0	-41.00	74	1.9	H	4.1	-36.90	-13	-23.90
3346.0	-44.20	222	1.3	V	4.1	-40.10	-13	-27.10
QPSK 1.4MHz Bandwidth, High channel								
1696.6	-25.10	108	1.1	H	0.5	-24.60	-13	-11.60
1696.6	-26.70	131	1.8	V	0.9	-25.80	-13	-12.80
2544.9	-36.40	153	1.9	H	3.5	-32.90	-13	-19.90
2544.9	-37.90	201	1.8	V	3.8	-34.10	-13	-21.10
3393.2	-41.20	114	1.8	H	4.5	-36.70	-13	-23.70
3393.2	-43.90	186	1.2	V	5.1	-38.80	-13	-25.80

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 7								
Test frequency range: 30MHz-26GHz								
QPSK 5MHz Bandwidth, Low channel								
5005.0	-52.40	309	1.3	H	9.3	-43.10	-25	-18.10
5005.0	-50.90	139	2.3	V	9.2	-41.70	-25	-16.70
7507.5	-56.50	89	2	H	15.4	-41.10	-25	-16.10
7507.5	-56.90	223	1	V	15.7	-41.20	-25	-16.20
QPSK 5MHz Bandwidth, Middle channel								
5070.0	-50.80	36	1.4	H	9.1	-41.70	-25	-16.70
5070.0	-50.10	97	1.7	V	9.3	-40.80	-25	-15.80
7605.0	-57.80	239	2.2	H	15.7	-42.10	-25	-17.10
7605.0	-57.80	175	1.4	V	15.6	-42.20	-25	-17.20
QPSK 5MHz Bandwidth, High channel								
5135.0	-49.80	178	1.3	H	9	-40.80	-25	-15.80
5135.0	-49.40	135	2.4	V	9.3	-40.10	-25	-15.10
7702.5	-56.60	248	2.1	H	15.5	-41.10	-25	-16.10
7702.5	-57.20	281	2	V	15.8	-41.40	-25	-16.40

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 12								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1399.4	-36.10	283	1.3	H	1.6	-34.50	-13	-21.50
1399.4	-38.40	74	1.1	V	1.8	-36.60	-13	-23.60
2099.1	-30.30	132	2.4	H	3.8	-26.50	-13	-13.50
2099.1	-33.00	184	1.7	V	3.8	-29.20	-13	-16.20
2798.8	-48.40	300	1.5	H	3.8	-44.60	-13	-31.60
2798.8	-49.70	151	2.2	V	4.5	-45.20	-13	-32.20
QPSK 1.4MHz Bandwidth, Middle channel								
1415.0	-35.10	240	1.9	H	1.7	-33.40	-13	-20.40
1415.0	-37.30	341	1.6	V	1.8	-35.50	-13	-22.50
2122.5	-30.00	91	2.2	H	4	-26.00	-13	-13.00
2122.5	-32.60	244	1.1	V	4	-28.60	-13	-15.60
2830.0	-48.30	197	2.5	H	4.2	-44.10	-13	-31.10
2830.0	-49.40	276	2.3	V	4.7	-44.70	-13	-31.70
QPSK 1.4MHz Bandwidth, High channel								
1430.6	-33.70	113	1.8	H	1.7	-32.00	-13	-19.00
1430.6	-36.20	191	2	V	1.8	-34.40	-13	-21.40
2145.9	-29.10	218	1.7	H	4.2	-24.90	-13	-11.90
2145.9	-31.60	178	1.5	V	4.2	-27.40	-13	-14.40
2861.2	-47.40	209	1.1	H	4.6	-42.80	-13	-29.80
2861.2	-49.20	161	2	V	4.8	-44.40	-13	-31.40

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 41								
Test frequency range: 30MHz-27GHz								
QPSK 5MHz Bandwidth, Low channel								
5075.0	-50.90	163	2.3	H	9	-41.90	-25	-16.90
5075.0	-50.80	100	1.3	V	9.3	-41.50	-25	-16.50
7612.5	-59.10	6	1.4	H	15.7	-43.40	-25	-18.40
7612.5	-58.00	75	2.4	V	15.7	-42.30	-25	-17.30
QPSK 5MHz Bandwidth, Middle channel								
5190.0	-50.00	97	1.6	H	8.5	-41.50	-25	-16.50
5190.0	-49.70	132	2.3	V	9	-40.70	-25	-15.70
7785.0	-57.80	56	2	H	15.5	-42.30	-25	-17.30
7785.0	-57.00	44	1.1	V	15.6	-41.40	-25	-16.40
QPSK 5MHz Bandwidth, High channel								
5305.0	-49.00	164	1.4	H	8.6	-40.40	-25	-15.40
5305.0	-47.70	178	1.4	V	8.6	-39.10	-25	-14.10
7957.5	-58.40	273	1.9	H	16.7	-41.70	-25	-16.70
7957.5	-57.70	33	2.4	V	16.8	-40.90	-25	-15.90

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Absolute Level - Limit

FCC§ 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to 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.

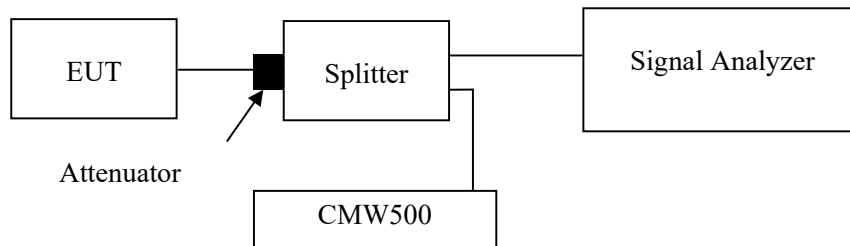
According to FCC §27.53 (m), For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel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

Test Procedure

ANSI C63.26-2015 Section 5.7

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data**Environmental Conditions**

Temperature:	24.9~26 °C
Relative Humidity:	46~54 %
ATM Pressure:	101.0 kPa

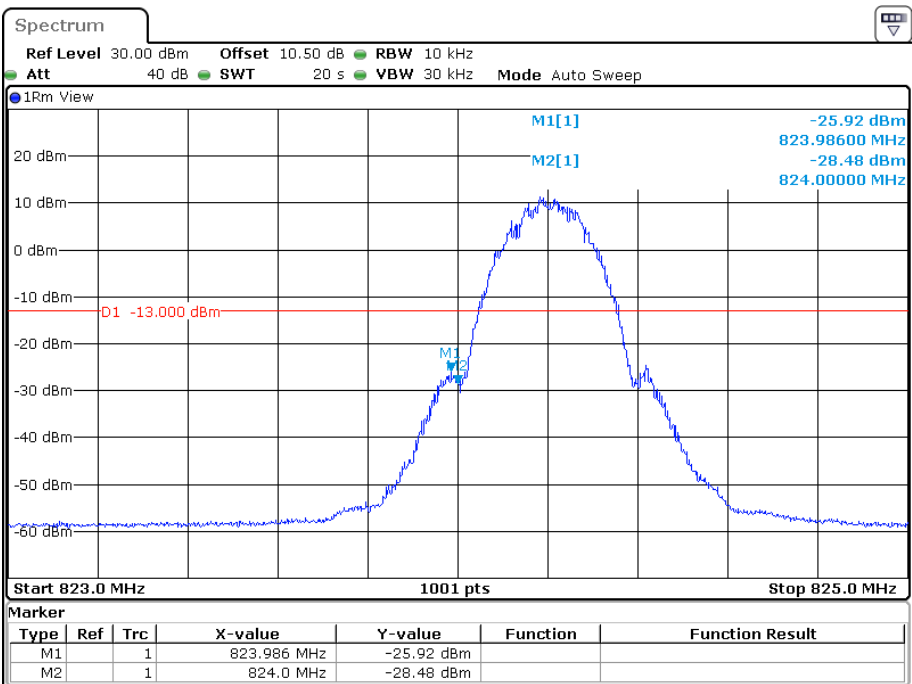
The testing was performed by Jacob Huang from 2023-06-26 to 2023-06-30.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

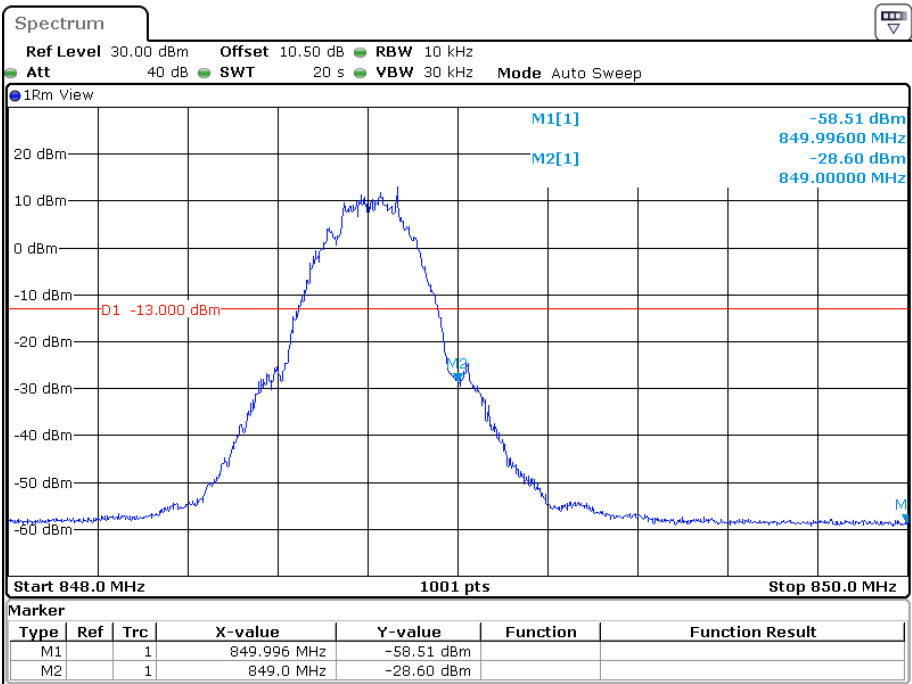
Please refer to the following plots.

Cellular Band, Left Band Edge for GSM (GMSK) Mode



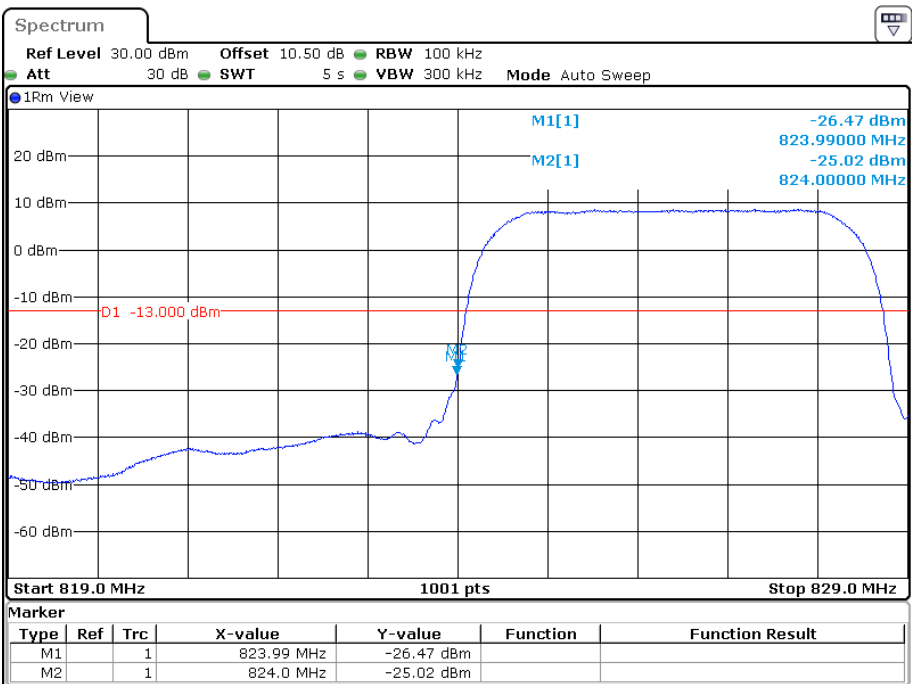
Date: 28.JUN.2023 00:23:48

Cellular Band, Right Band Edge for GSM (GMSK) Mode



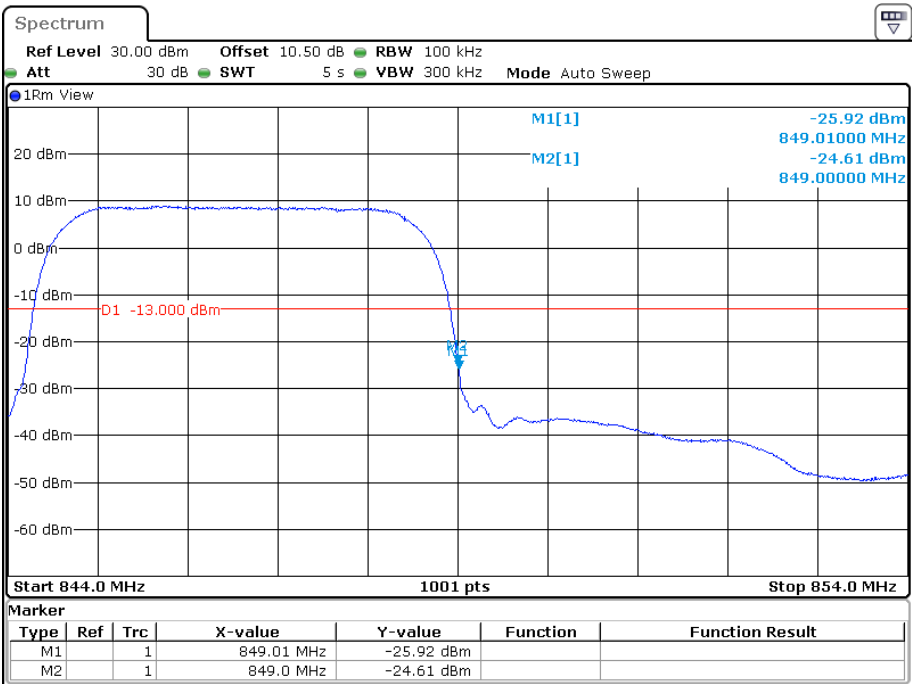
Date: 28.JUN.2023 00:31:26

Cellular Band, Left Band Edge for RMC (BPSK) Mode



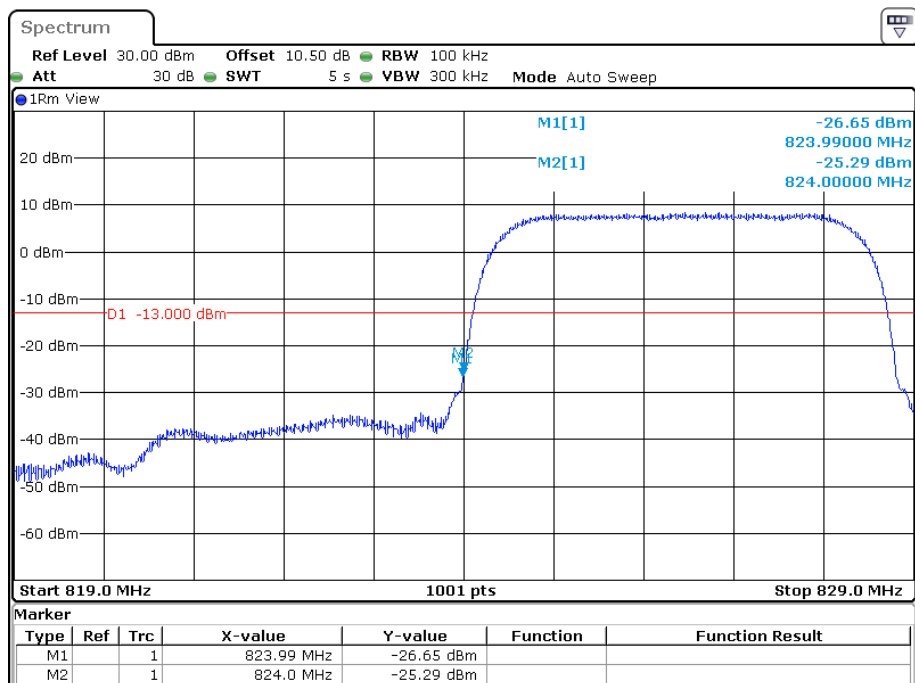
Date: 27.JUN.2023 22:56:27

Cellular Band, Right Band Edge for RMC (BPSK) Mode



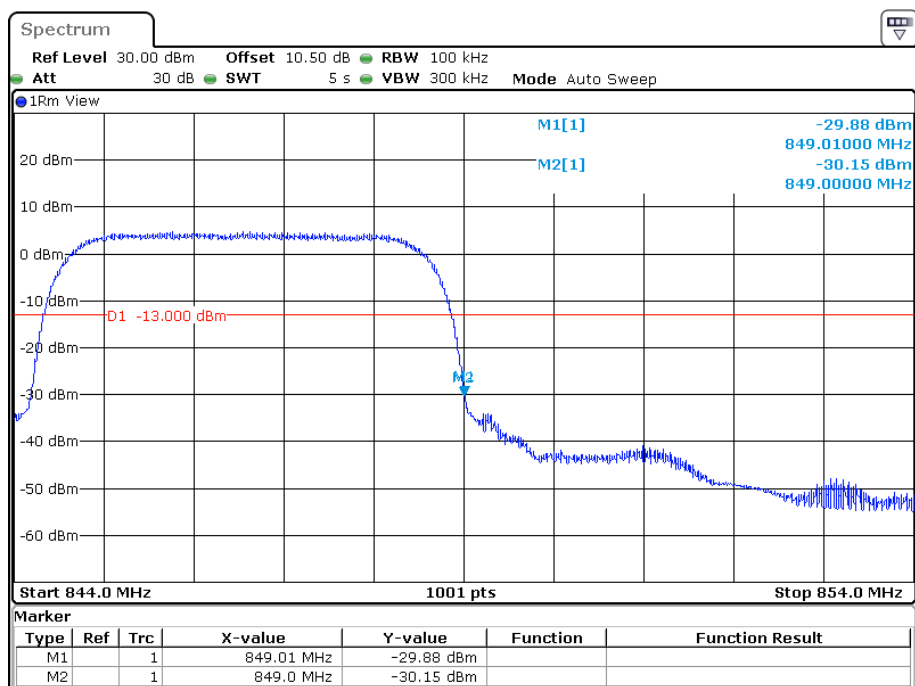
Date: 27.JUN.2023 22:59:42

Cellular Band, Left Band Edge for HSDPA(16QAM) Mode



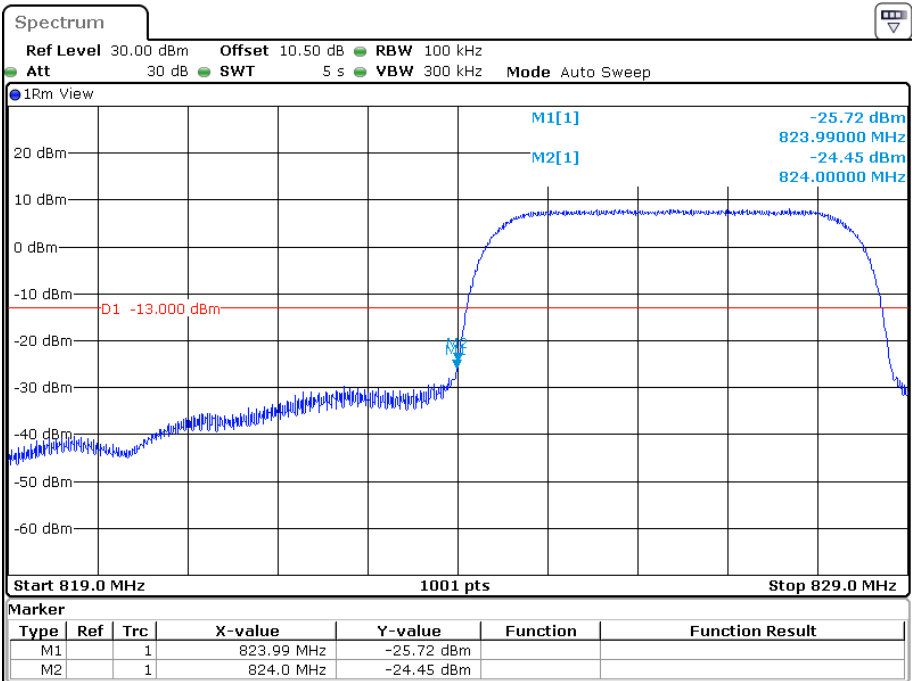
Date: 27.JUN.2023 23:06:36

Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



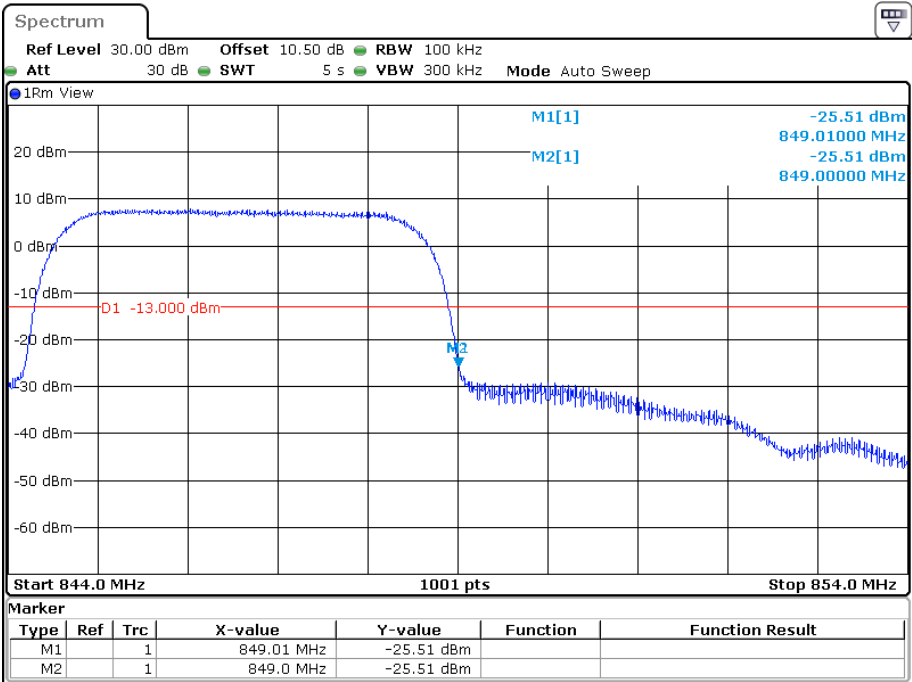
Date: 27.JUN.2023 22:44:03

Cellular Band, Left Band Edge for HSUPA (QPSK) Mode



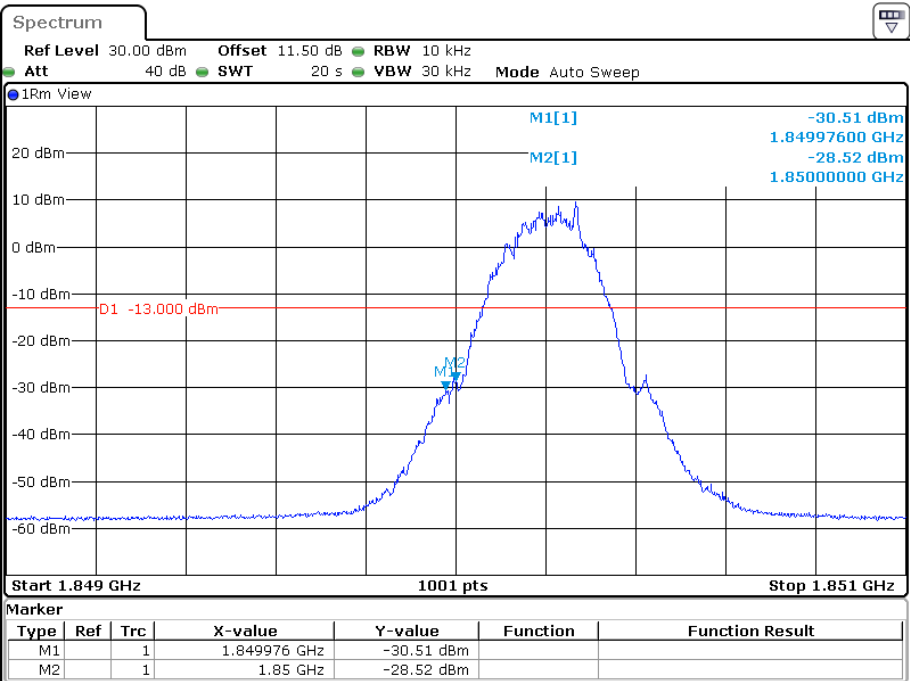
Date: 27.JUN.2023 22:33:35

Cellular Band, Right Band Edge for HSUPA (QPSK) Mode



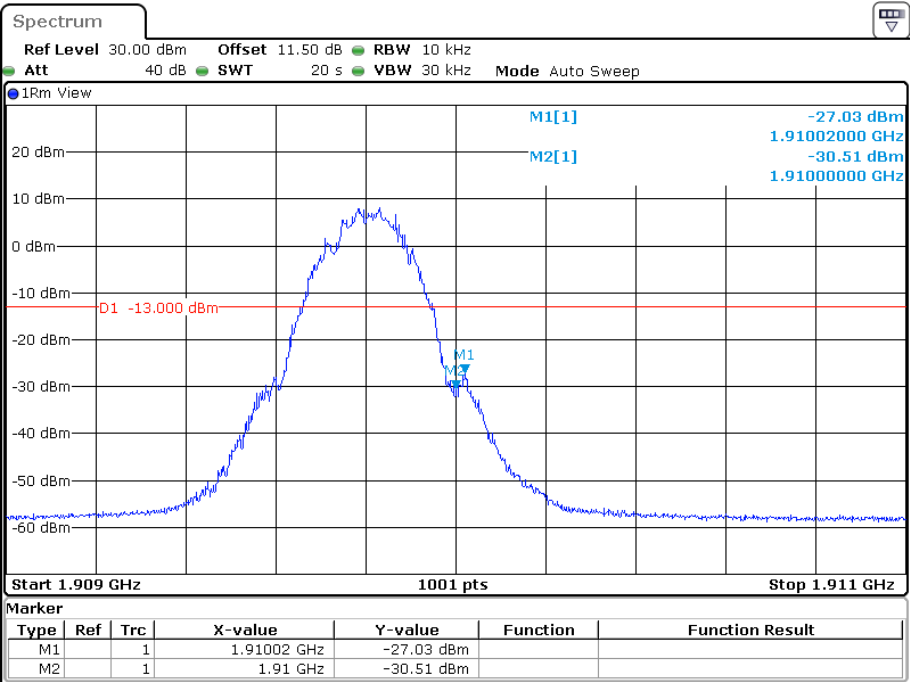
Date: 27.JUN.2023 22:39:33

PCS Band, Left Band Edge for GSM (GMSK) Mode



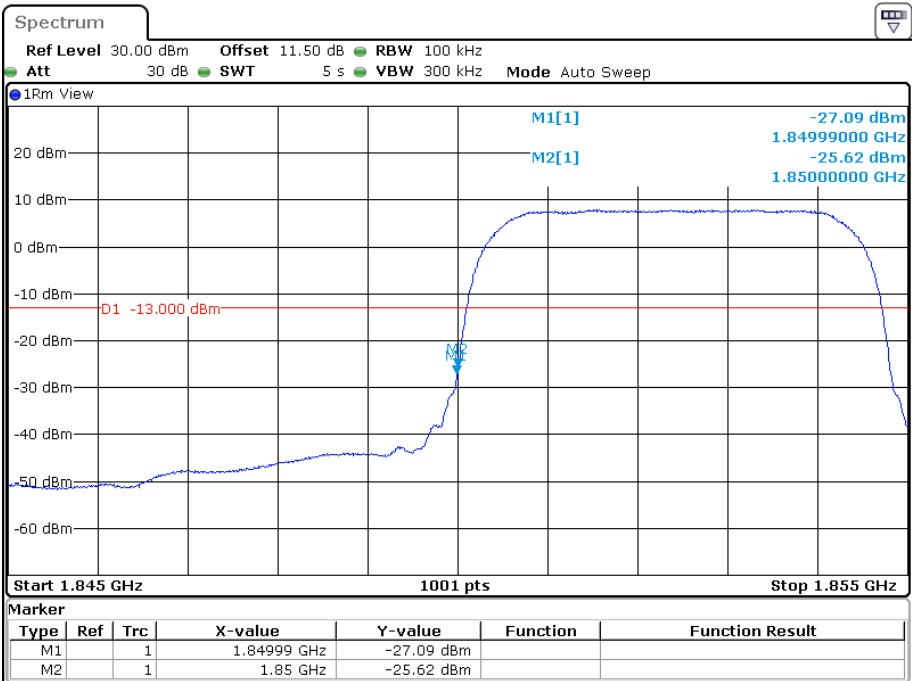
Date: 28.JUN.2023 00:40:17

PCS Band, Right Band Edge for GSM (GMSK) Mode



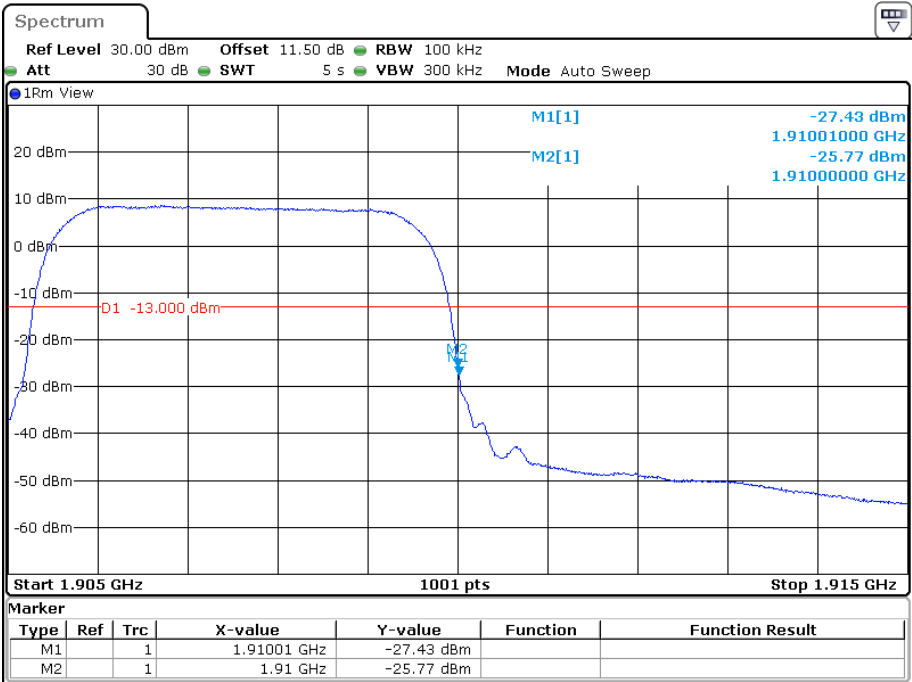
Date: 28.JUN.2023 00:48:40

PCS Band, Left Band Edge for RMC (BPSK) Mode



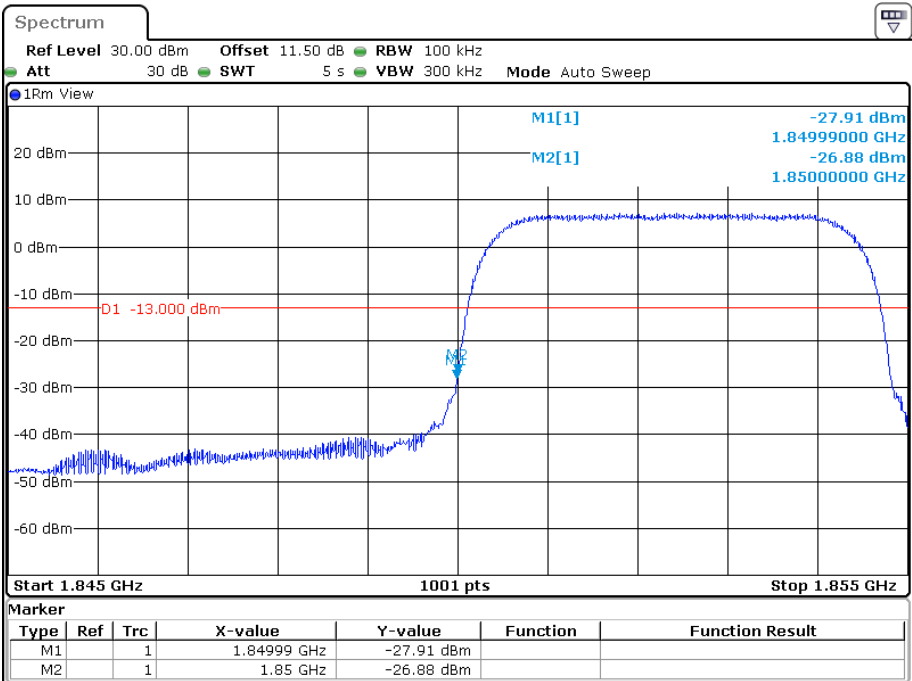
Date: 27.JUN.2023 20:45:17

PCS Band, Right Band Edge for RMC (BPSK) Mode



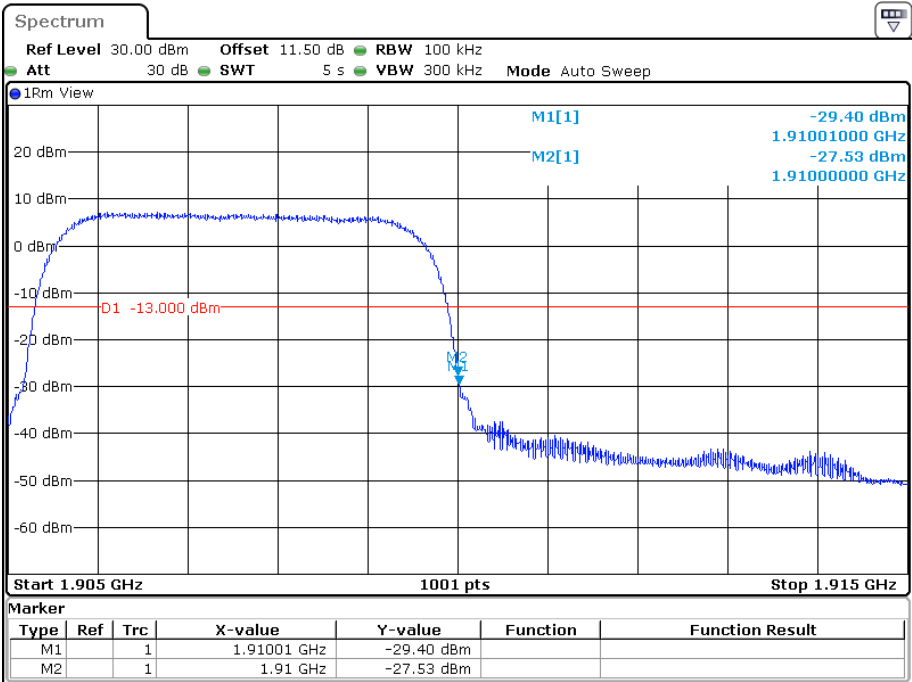
Date: 27.JUN.2023 20:52:57

PCS Band, Left Band Edge for HSDPA(16QAM) Mode



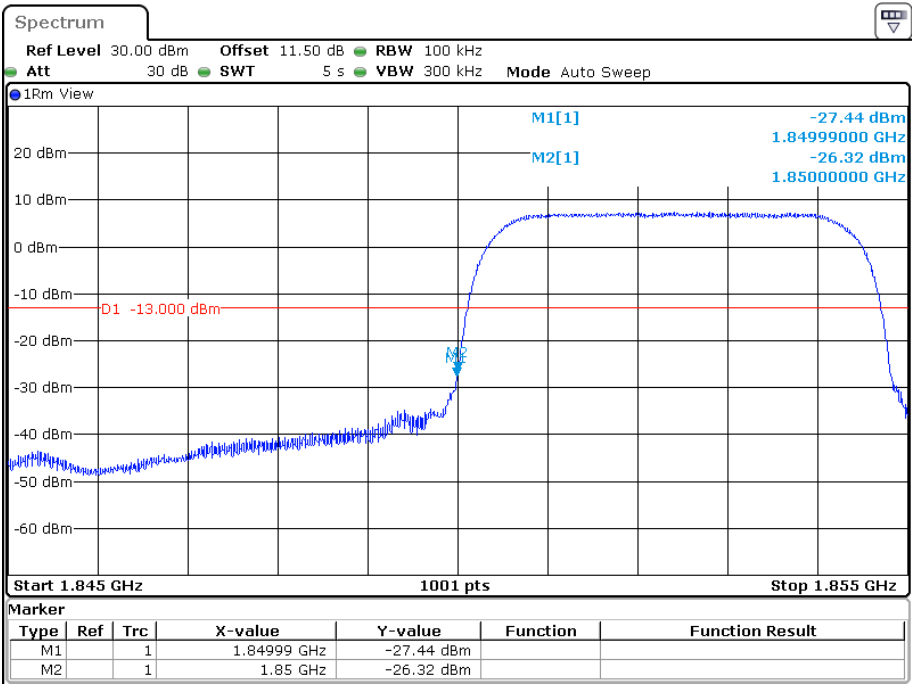
Date: 27.JUN.2023 22:06:35

PCS Band, Right Band Edge for HSDPA (16QAM) Mode



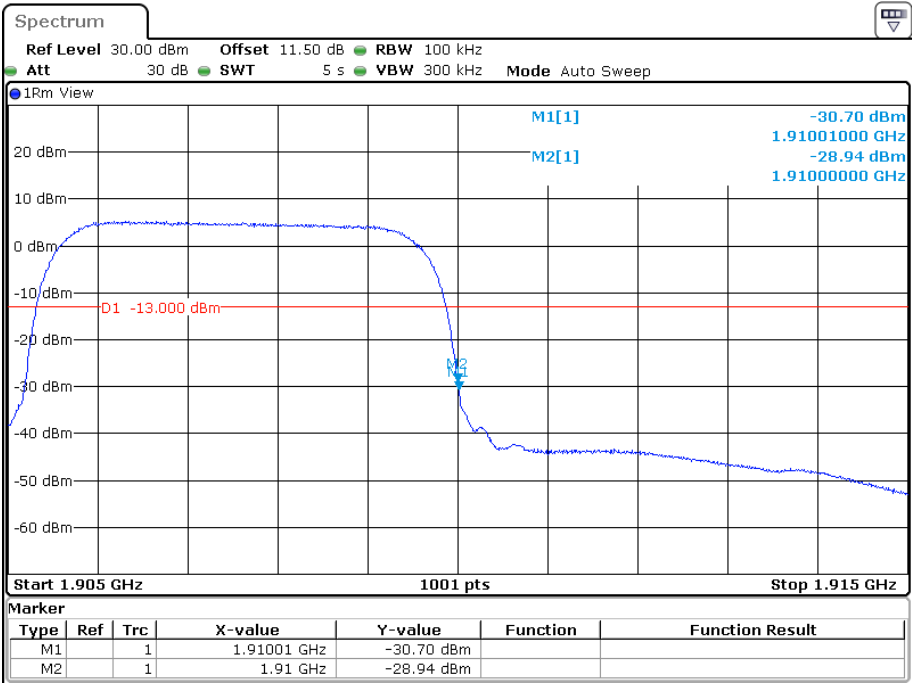
Date: 27.JUN.2023 22:13:15

PCS Band, Left Band Edge for HSUPA (QPSK) Mode



Date: 27.JUN.2023 22:27:41

PCS Band, Right Band Edge for HSUPA (QPSK) Mode



Date: 27.JUN.2023 22:19:36

The test plots of LTE bands please refer to the Appendix C.

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY**Applicable Standard**

FCC § 2.1055, §22.355, §24.235&§27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

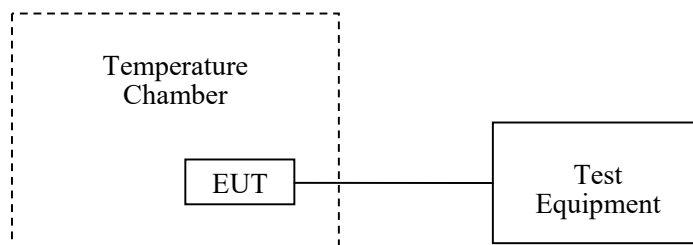
Test Procedure

ANSI C63.26-2015 Section 5.6

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data**Environmental Conditions**

Temperature:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-06-26 to 2023-06-28.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)**GSM Mode**

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	9	0.0108	2.5
-20		-4	-0.0048	2.5
-10		8	0.0096	2.5
0		3	0.0036	2.5
10		-5	-0.0060	2.5
20		5	0.0060	2.5
30		6	0.0072	2.5
40		1	0.0012	2.5
50		-5	-0.0060	2.5
20	L.V.	9	0.0108	2.5
	H.V.	10	0.0120	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	1	0.0012	2.5
-20		-13	-0.0155	2.5
-10		-8	-0.0096	2.5
0		-8	-0.0096	2.5
10		-3	-0.0036	2.5
20		-10	-0.0120	2.5
30		-9	-0.0108	2.5
40		-11	-0.0131	2.5
50		-7	-0.0084	2.5
20	L.V.	-5	-0.0060	2.5
	H.V.	3	0.0036	2.5

PCS Band (Part 24E)**GSM Mode**

Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.0448	1909.9546	1850	1910
-20		1850.0467	1909.9844	1850	1910
-10		1850.0782	1909.9797	1850	1910
0		1850.0687	1909.9540	1850	1910
10		1850.0256	1909.9738	1850	1910
20		1850.0623	1909.9127	1850	1910
30		1850.0489	1909.9667	1850	1910
40		1850.0512	1909.9642	1850	1910
50		1850.0641	1909.9615	1850	1910
20	L.V.	1850.0222	1909.9480	1850	1910
	H.V.	1850.0333	1909.9536	1850	1910

WCDMA Mode

Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.0477	1909.9829	1850	1910
-20		1850.0276	1909.9857	1850	1910
-10		1850.0261	1909.9879	1850	1910
0		1850.0253	1909.9992	1850	1910
10		1850.0344	1909.9370	1850	1910
20		1850.0514	1909.9832	1850	1910
30		1850.0126	1909.9973	1850	1910
40		1850.0322	1909.9337	1850	1910
50		1850.0508	1909.9827	1850	1910
20	L.V.	1850.0768	1909.9724	1850	1910
	H.V.	1850.0127	1909.9169	1850	1910

LTE:
QPSK:
Band 2:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.1159	1909.8724	1850	1910
-20		1850.1166	1909.8731	1850	1910
-10		1850.1136	1909.8762	1850	1910
0		1850.1166	1909.8737	1850	1910
10		1850.1141	1909.8749	1850	1910
20		1850.1168	1909.8385	1850	1910
30		1850.1139	1909.8767	1850	1910
40		1850.1141	1909.8767	1850	1910
50		1850.1138	1909.8749	1850	1910
20	L.V.	1850.1155	1909.8378	1850	1910
	H.V.	1850.1062	1909.8764	1850	1910

Band 5:

10.0 MHz Middle Channel, f ₀ =836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	9	0.0108	2.5
-20		-7	-0.0084	2.5
-10		8	0.0096	2.5
0		-6	-0.0072	2.5
10		-7	-0.0084	2.5
20		8	0.0096	2.5
30		10	0.0120	2.5
40		-7	-0.0084	2.5
50		7	0.0084	2.5
20	L.V.	6	0.0072	2.5
	H.V.	8	0.0096	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.0805	2569.9264	2500	2570
-20		2500.0413	2569.9473	2500	2570
-10		2500.0918	2569.9130	2500	2570
0		2500.0659	2569.9130	2500	2570
10		2500.0745	2569.9476	2500	2570
20		2500.0654	2569.9657	2500	2570
30		2500.0621	2569.9367	2500	2570
40		2500.0521	2569.9955	2500	2570
50		2500.0705	2569.9500	2500	2570
20	L.V.	2500.0707	2569.9280	2500	2570
	H.V.	2500.0926	2569.9767	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	699.1443	715.8881	699	716
-20		699.1449	715.8733	699	716
-10		699.1442	715.8460	699	716
0		699.1445	715.8652	699	716
10		699.1339	715.8428	699	716
20		699.1430	715.8291	699	716
30		699.1392	715.8333	699	716
40		699.1357	715.8326	699	716
50		699.1446	715.8461	699	716
20	L.V.	699.1381	715.8684	699	716
	H.V.	699.1391	715.8683	699	716

Band 41:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2535.0615	2654.9274	2535	2655
-20		2535.0702	2654.9264	2535	2655
-10		2535.0662	2654.9591	2535	2655
0		2535.0941	2654.9464	2535	2655
10		2535.0868	2654.9269	2535	2655
20		2535.0746	2654.9386	2535	2655
30		2535.0787	2654.9263	2535	2655
40		2535.0772	2654.9153	2535	2655
50		2535.0864	2654.9852	2535	2655
20	L.V.	2535.0917	2654.9653	2535	2655
	H.V.	2535.0841	2654.9560	2535	2655

16QAM:**Band 2:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.1174	1909.8738	1850	1910
-20		1850.1175	1909.8748	1850	1910
-10		1850.1198	1909.8739	1850	1910
0		1850.1166	1909.8725	1850	1910
10		1850.1160	1909.8761	1850	1910
20		1850.1159	1909.8746	1850	1910
30		1850.1142	1909.8760	1850	1910
40		1850.1132	1909.8753	1850	1910
50		1850.1135	1909.8757	1850	1910
20	L.V.	1850.1144	1909.8752	1850	1910
	H.V.	1850.1062	1909.8759	1850	1910

Band 5:

10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-12	-0.0143	2.5
-20		7	0.0084	2.5
-10		9	0.0108	2.5
0		6	0.0072	2.5
10		-5	-0.0060	2.5
20		9	0.0108	2.5
30		-7	-0.0084	2.5
40		9	0.0108	2.5
50		8	0.0096	2.5
20	L.V.	10	0.0120	2.5
	H.V.	7	0.0084	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.0784	2569.9282	2500	2570
-20		2500.0841	2569.9576	2500	2570
-10		2500.0506	2569.9267	2500	2570
0		2500.0696	2569.9157	2500	2570
10		2500.0806	2569.9600	2500	2570
20		2500.0982	2569.9586	2500	2570
30		2500.0944	2569.9572	2500	2570
40		2500.0661	2569.9553	2500	2570
50		2500.0866	2569.9278	2500	2570
20	L.V.	2500.0668	2569.9250	2500	2570
	H.V.	2500.0828	2569.9169	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	699.1326	715.8384	699	716
-20		699.1348	715.8332	699	716
-10		699.1333	715.8362	699	716
0		699.1323	715.8343	699	716
10		699.1332	715.8325	699	716
20		699.1316	715.8379	699	716
30		699.1384	715.8326	699	716
40		699.1345	715.8321	699	716
50		699.1339	715.8362	699	716
20	L.V.	699.1375	715.8372	699	716
	H.V.	699.1376	715.8380	699	716

Band 41:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2535.0819	2654.9271	2535	2655
-20		2535.0696	2654.9266	2535	2655
-10		2535.0468	2654.9157	2535	2655
0		2535.0939	2654.9603	2535	2655
10		2535.0560	2654.9665	2535	2655
20		2535.0451	2654.9457	2535	2655
30		2535.0698	2654.9664	2535	2655
40		2535.0775	2654.9278	2535	2655
50		2535.0669	2654.9484	2535	2655
20	L.V.	2535.0736	2654.9597	2535	2655
	H.V.	2535.0853	2654.9697	2535	2655

***** END OF REPORT *****