



TEST REPORT

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Report Number : RA230522-28128E-RF-00A
FCC ID: 2ATZ4-A15ACT

Test Standard (s)

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

Sample Description

Product Type: Smart phone
Test Model No.: MP33
Multiple Model(s) No.: MP34
Trade Mark: UMIDIGI
Date Received: 2023/05/22
Report Date: 2023/06/04

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

Prepared and Checked By:

Roger Ling

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EMC Engineer

Approved By:

Candy Li

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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	RA230522-28128E-RF-00A	Original Report	2023/06/04

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Smart phone
Tested model	MP33
Multiple Model(s)	MP34 (model difference see product declaration letter of similarity)
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 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 13: 777-787MHz(TX); 746-756MHz(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: -0.63dBi WCDMA 1900/PCS1900/LTE B2: -0.42dBi LTE B12: -0.65dBi, LTE B13: -0.71dBi, LTE B41: -0.38dBi (provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5V/7V/9V/12V from adapter
Sample serial number	RE: 26A9-1 RF: 26A9-2 (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-FC017K7-US Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 5.0V, 2.0A or 7.0V, 2.0A or DC 9.0V, 2.0A, or DC 12.0V, 1.5A, 18.0W
Adapter 2 information	Model: QZ-02002AC00 Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 5.0V, 3.0A or DC 9.0V, 2.22A or DC 12.0V, 1.67A(20.0W)

Note: Pre-scan with the model MP33 and MP34, the worst case is MP33 which was chosen for full test.

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 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 B13	5	779.5	782	784.5
	10	\	782	\
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.

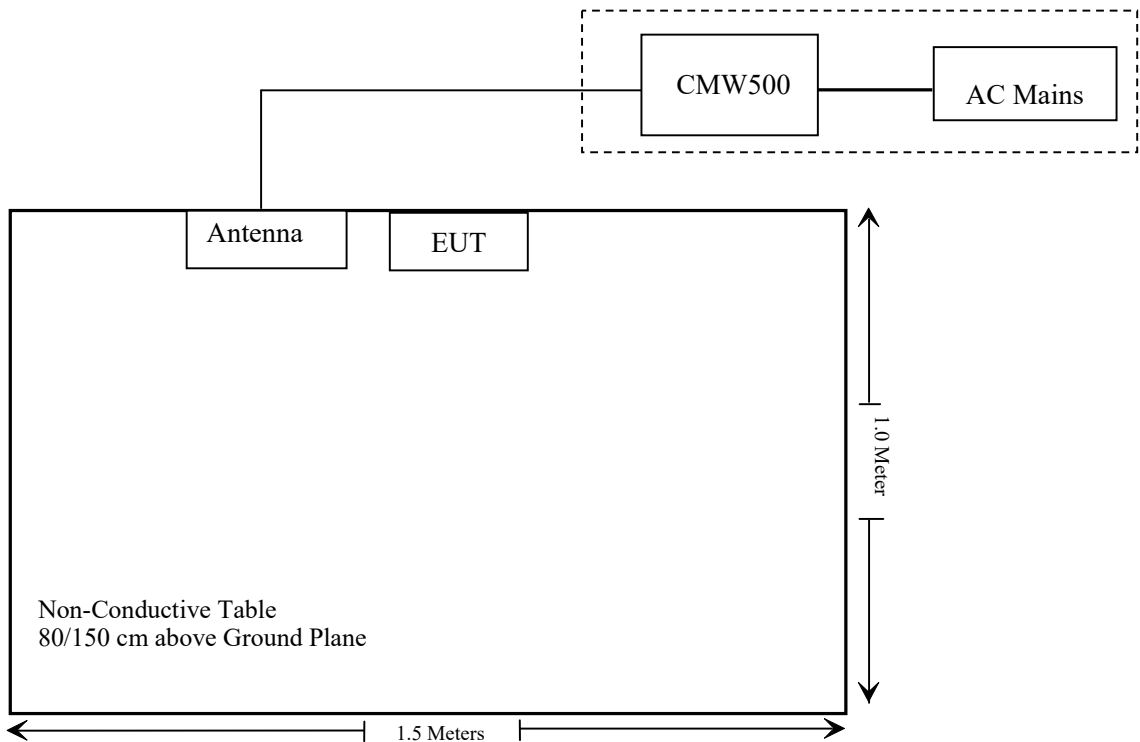
Support Equipment List and Details

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 Mains	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
Mini-Circuits	High Pass Filter	NHP-600+	15542	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
RF Conducted Test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2022/07/04	2023/07/03
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
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: CR230528128-20A.

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.

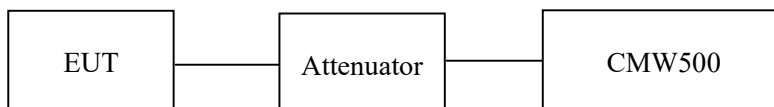
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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:	26~28.8 °C
Relative Humidity:	46.8~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-05-19 to 2023-06-03.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP (dBm)	Limit (dBm)
GSM	128	824.2	32.1	28.82	38.45
	190	836.6	32.1	28.82	38.45
	251	848.8	32.2	28.92	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	32.14	29.99	28.21	26.37	28.86	26.71	24.93	23.09	38.45
	190	836.6	32.18	31.36	28.05	26.00	28.90	28.08	24.77	22.72	38.45
	251	848.8	32.16	29.51	27.79	25.76	28.88	26.23	24.51	22.48	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP (dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		23.22	23.23	23.21	19.94	19.95	19.93
	HSDPA	1	22.54	22.50	22.23	19.26	19.22	18.95
		2	22.72	22.82	22.45	19.44	19.54	19.17
		3	22.88	22.94	22.60	19.60	19.66	19.32
		4	22.98	22.97	22.73	19.70	19.69	19.45
	HSUPA	1	22.50	22.49	22.25	19.22	19.21	18.97
		2	22.86	22.78	22.87	19.58	19.50	19.59
		3	22.87	22.90	22.94	19.59	19.62	19.66
		4	23.06	22.97	23.04	19.78	19.69	19.76
		5	23.21	23.05	23.13	19.93	19.77	19.85
	HSPA+	1	22.59	22.65	22.78	19.31	19.37	19.50

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

GSM850/WCDMA Band5: Antenna Gain = -0.63dBi = -2.78dBd (0dBd=2.15(dBi)

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	30.6	30.18	33
	661	1880.0	30.4	29.98	33
	810	1909.8	30.1	29.68	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	30.60	28.17	26.37	24.39	30.18	27.75	25.95	23.97	33
	661	1880.0	30.53	28.10	26.26	24.56	30.11	27.68	25.84	24.14	33
	810	1909.8	30.15	27.88	26.02	24.32	29.73	27.46	25.60	23.90	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.90	22.99	23.01	19.62	19.71	19.73
	HSDPA	1	22.66	21.68	21.54	19.38	18.40	18.26
		2	22.46	22.07	21.96	19.18	18.79	18.68
		3	22.50	22.24	22.02	19.22	18.96	18.74
		4	22.52	22.26	22.16	19.24	18.98	18.88
	HSUPA	1	21.79	21.83	22.14	18.51	18.55	18.86
		2	22.34	21.91	21.82	19.06	18.63	18.54
		3	22.47	22.09	21.86	19.19	18.81	18.58
		4	22.65	22.15	21.98	19.37	18.87	18.70
		5	22.75	22.23	22.08	19.47	18.95	18.80
	HSPA+	1	21.6	21.75	21.83	18.32	18.47	18.55

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

PCS1900/WCDMA Band 2: Antenna Gain = -0.42dBi

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	23.24	23.52	23.53	22.82	23.10	23.11
		RB1#3	23.18	23.51	23.51	22.76	23.09	23.09
		RB1#5	23.22	23.48	23.52	22.80	23.06	23.10
		RB3#0	23.29	23.4	23.52	22.87	22.98	23.10
		RB3#3	23.31	23.34	23.56	22.89	22.92	23.14
		RB6#0	22.29	22.42	22.5	21.87	22.00	22.08
	16QAM	RB1#0	21.99	22.35	22.3	21.57	21.93	21.88
		RB1#3	21.84	22.34	22.03	21.42	21.92	21.61
		RB1#5	21.85	22.47	22.03	21.43	22.05	21.61
		RB3#0	22.12	22.37	22.49	21.70	21.95	22.07
		RB3#3	22.14	22.38	22.42	21.72	21.96	22.00
		RB6#0	21.31	21.37	21.63	20.89	20.95	21.21
3.0	QPSK	RB1#0	23.3	23.29	23.47	22.88	22.87	23.05
		RB1#8	23.3	23.25	23.48	22.88	22.83	23.06
		RB1#14	23.29	23.29	23.49	22.87	22.87	23.07
		RB6#0	22.3	22.4	22.54	21.88	21.98	22.12
		RB6#9	22.3	22.35	22.52	21.88	21.93	22.10
		RB15#0	22.27	22.35	22.61	21.85	21.93	22.19
	16QAM	RB1#0	23.01	22.05	22.89	22.59	21.63	22.47
		RB1#8	23.02	22.05	22.97	22.60	21.63	22.55
		RB1#14	22.93	22.03	22.94	22.51	21.61	22.52
		RB6#0	21.42	21.31	21.46	21.00	20.89	21.04
		RB6#9	21.37	21.54	21.53	20.95	21.12	21.11
		RB15#0	21.38	21.51	21.7	20.96	21.09	21.28

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	23.37	23.19	23.39	22.95	22.77	22.97
		RB1#13	23.4	23.25	23.41	22.98	22.83	22.99
		RB1#24	23.39	23.2	23.47	22.97	22.78	23.05
		RB15#0	22.25	22.42	22.55	21.83	22.00	22.13
		RB15#10	22.34	22.34	22.59	21.92	21.92	22.17
		RB25#0	22.28	22.34	22.5	21.86	21.92	22.08
	16QAM	RB1#0	22.29	22.42	21.75	21.87	22.00	21.33
		RB1#13	22.25	22.46	21.67	21.83	22.04	21.25
		RB1#24	22.25	22.4	21.69	21.83	21.98	21.27
		RB15#0	21.25	21.34	21.57	20.83	20.92	21.15
		RB15#10	21.15	21.36	21.65	20.73	20.94	21.23
		RB25#0	21.21	21.55	21.6	20.79	21.13	21.18
10.0	QPSK	RB1#0	23.24	23.29	23.33	22.82	22.87	22.91
		RB1#25	23.23	23.27	23.51	22.81	22.85	23.09
		RB1#49	23.29	23.27	23.47	22.87	22.85	23.05
		RB25#0	22.3	22.36	22.53	21.88	21.94	22.11
		RB25#25	22.34	22.38	22.5	21.92	21.96	22.08
		RB50#0	22.32	22.38	22.54	21.90	21.96	22.12
	16QAM	RB1#0	23.01	22.21	22.88	22.59	21.79	22.46
		RB1#25	22.96	22.19	22.95	22.54	21.77	22.53
		RB1#49	23.05	22.11	22.73	22.63	21.69	22.31
		RB25#0	21.31	21.58	21.52	20.89	21.16	21.10
		RB25#25	21.39	21.52	21.48	20.97	21.10	21.06
		RB50#0	21.31	21.47	21.5	20.89	21.05	21.08

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	23.31	23.19	23.37	22.89	22.77	22.95
		RB1#38	23.29	23.14	23.45	22.87	22.72	23.03
		RB1#74	23.38	23.15	23.51	22.96	22.73	23.09
		RB36#0	22.28	22.35	22.44	21.86	21.93	22.02
		RB36#39	22.39	22.46	22.5	21.97	22.04	22.08
		RB75#0	22.34	22.28	22.43	21.92	21.86	22.01
	16QAM	RB1#0	22.46	22.47	22.79	22.04	22.05	22.37
		RB1#38	22.44	22.44	22.86	22.02	22.02	22.44
		RB1#74	22.52	22.36	22.98	22.10	21.94	22.56
		RB36#0	21.42	21.36	21.4	21.00	20.94	20.98
		RB36#39	21.39	21.35	21.47	20.97	20.93	21.05
		RB75#0	21.45	21.38	21.55	21.03	20.96	21.13
20.0	QPSK	RB1#0	23.46	23.39	23.46	23.04	22.97	23.04
		RB1#50	23.38	23.39	23.45	22.96	22.97	23.03
		RB1#99	23.44	23.42	23.59	23.02	23.00	23.17
		RB50#0	22.32	22.44	22.41	21.90	22.02	21.99
		RB50#50	22.26	22.28	22.49	21.84	21.86	22.07
		RB100#0	22.39	22.35	22.34	21.97	21.93	21.92
	16QAM	RB1#0	22.65	23.29	22.54	22.23	22.87	22.12
		RB1#50	22.63	23.29	22.57	22.21	22.87	22.15
		RB1#99	22.42	23.25	22.64	22.00	22.83	22.22
		RB50#0	21.4	21.52	21.55	20.98	21.10	21.13
		RB50#50	21.41	21.36	21.57	20.99	20.94	21.15
		RB100#0	21.35	21.49	21.48	20.93	21.07	21.06

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

For Band2: Antenna Gain = -0.42dBi

Limit: EIRP ≤ 33dBm

LTE Band 5

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	22.39	23.34	23.38	19.11	20.06	20.10
		RB1#3	23.31	23.35	23.39	20.03	20.07	20.11
		RB1#5	23.25	23.34	23.4	19.97	20.06	20.12
		RB3#0	23.46	23.37	23.31	20.18	20.09	20.03
		RB3#3	23.46	23.44	23.28	20.18	20.16	20.00
		RB6#0	22.36	22.26	22.38	19.08	18.98	19.10
	16QAM	RB1#0	22.08	22.99	23.46	18.80	19.71	20.18
		RB1#3	22.01	23.03	23.46	18.73	19.75	20.18
		RB1#5	22.12	22.99	23.48	18.84	19.71	20.20
		RB3#0	22.59	22.21	22.27	19.31	18.93	18.99
		RB3#3	22.5	22.2	22.3	19.22	18.92	19.02
		RB6#0	21.58	21.4	21.61	18.30	18.12	18.33
3.0	QPSK	RB1#0	23.43	23.48	23.37	20.15	20.20	20.09
		RB1#8	23.42	23.37	23.4	20.14	20.09	20.12
		RB1#14	23.4	23.38	23.33	20.12	20.10	20.05
		RB6#0	22.46	22.45	22.43	19.18	19.17	19.15
		RB6#9	22.44	22.36	22.4	19.16	19.08	19.12
		RB15#0	22.36	22.44	22.29	19.08	19.16	19.01
	16QAM	RB1#0	23.19	21.95	22.6	19.91	18.67	19.32
		RB1#8	23.13	21.86	22.52	19.85	18.58	19.24
		RB1#14	23.05	21.81	22.58	19.77	18.53	19.30
		RB6#0	21.45	21.54	21.47	18.17	18.26	18.19
		RB6#9	21.5	21.28	21.54	18.22	18.00	18.26
		RB15#0	21.48	21.39	21.36	18.20	18.11	18.08

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	23.51	23.28	23.27	20.23	20.00	19.99
		RB1#13	23.39	23.18	23.27	20.11	19.90	19.99
		RB1#24	23.44	23.27	23.24	20.16	19.99	19.96
		RB15#0	22.44	22.48	22.53	19.16	19.20	19.25
		RB15#10	22.46	22.39	22.36	19.18	19.11	19.08
		RB25#0	22.41	22.42	22.43	19.13	19.14	19.15
	16QAM	RB1#0	22.63	22.42	21.57	19.35	19.14	18.29
		RB1#13	22.51	22.34	21.52	19.23	19.06	18.24
		RB1#24	22.51	22.32	21.56	19.23	19.04	18.28
		RB15#0	21.36	21.43	21.43	18.08	18.15	18.15
		RB15#10	21.26	21.3	21.39	17.98	18.02	18.11
		RB25#0	21.38	21.48	21.48	18.10	18.20	18.20
10.0	QPSK	RB1#0	23.6	23.25	23.44	20.32	19.97	20.16
		RB1#25	23.51	23.28	23.34	20.23	20.00	20.06
		RB1#49	23.52	23.21	23.32	20.24	19.93	20.04
		RB25#0	22.33	22.48	22.45	19.05	19.20	19.17
		RB25#25	22.3	22.46	22.33	19.02	19.18	19.05
		RB50#0	22.47	22.47	22.36	19.19	19.19	19.08
	16QAM	RB1#0	22.62	22.11	22.77	19.34	18.83	19.49
		RB1#25	22.51	22.12	22.75	19.23	18.84	19.47
		RB1#49	22.53	22.11	22.83	19.25	18.83	19.55
		RB25#0	21.53	21.58	21.42	18.25	18.30	18.14
		RB25#25	21.44	21.55	21.4	18.16	18.27	18.12
		RB50#0	21.51	21.47	21.39	18.23	18.19	18.11

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

For Band5: Antenna Gain = -0.63dBi = -2.78dBd (0dBd=2.15dBi)

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

Limit: ERP≤38.45dBm

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	23.87	23.72	23.67	20.57	20.42	20.37
		RB1#3	23.81	23.77	24	20.51	20.47	20.70
		RB1#5	23.84	23.7	23.85	20.54	20.40	20.55
		RB3#0	23.85	23.74	23.87	20.55	20.44	20.57
		RB3#3	23.76	23.77	23.96	20.46	20.47	20.66
		RB6#0	22.83	23.15	22.68	19.53	19.85	19.38
	16QAM	RB1#0	22.89	22.23	23.21	19.59	18.93	19.91
		RB1#3	22.89	22.67	22.94	19.59	19.37	19.64
		RB1#5	22.88	22.71	22.9	19.58	19.41	19.60
		RB3#0	22.79	23.01	23.15	19.49	19.71	19.85
		RB3#3	22.74	22.94	22.68	19.44	19.64	19.38
		RB6#0	22.32	22.21	21.75	19.02	18.91	18.45
3.0	QPSK	RB1#0	23.81	23.77	23.77	20.51	20.47	20.47
		RB1#8	23.78	23.73	23.81	20.48	20.43	20.51
		RB1#14	23.83	23.67	23.84	20.53	20.37	20.54
		RB6#0	22.8	22.73	23.18	19.50	19.43	19.88
		RB6#9	22.75	23.24	22.7	19.45	19.94	19.40
		RB15#0	22.72	23.22	23.11	19.42	19.92	19.81
	16QAM	RB1#0	22.89	22.32	23.36	19.59	19.02	20.06
		RB1#8	22.94	22.65	23.32	19.64	19.35	20.02
		RB1#14	22.93	22.62	22.92	19.63	19.32	19.62
		RB6#0	22.32	21.81	22.33	19.02	18.51	19.03
		RB6#9	22.35	22.16	21.77	19.05	18.86	18.47
		RB15#0	22.18	22.23	22.28	18.88	18.93	18.98

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	23.93	23.6	23.71	20.63	20.30	20.41
		RB1#13	23.85	23.64	23.67	20.55	20.34	20.37
		RB1#24	23.88	23.61	23.75	20.58	20.31	20.45
		RB15#0	22.82	22.78	23.29	19.52	19.48	19.99
		RB15#10	22.81	23.13	23.12	19.51	19.83	19.82
		RB25#0	22.76	23.2	23.13	19.46	19.90	19.83
	16QAM	RB1#0	22.71	22.76	22.35	19.41	19.46	19.05
		RB1#13	22.67	23.13	22.41	19.37	19.83	19.11
		RB1#24	22.82	22.74	21.96	19.52	19.44	18.66
		RB15#0	22.03	21.64	22.34	18.73	18.34	19.04
		RB15#10	22.07	22.11	22.23	18.77	18.81	18.93
		RB25#0	22.15	22.31	22.32	18.85	19.01	19.02
10.0	QPSK	RB1#0	23.8	23.65	23.82	20.50	20.35	20.52
		RB1#25	23.93	23.7	23.73	20.63	20.40	20.43
		RB1#49	23.79	23.7	23.83	20.49	20.40	20.53
		RB25#0	22.77	22.74	23.13	19.47	19.44	19.83
		RB25#25	22.85	22.86	23.12	19.55	19.56	19.82
		RB50#0	22.94	23.2	22.78	19.64	19.90	19.48
	16QAM	RB1#0	23.46	22.43	23.08	20.16	19.13	19.78
		RB1#25	23.44	22.86	23.13	20.14	19.56	19.83
		RB1#49	23.81	22.9	23.17	20.51	19.60	19.87
		RB25#0	22.24	21.93	22.26	18.94	18.63	18.96
		RB25#25	21.83	22.02	22.22	18.53	18.72	18.92
		RB50#0	22.25	22.3	21.75	18.95	19.00	18.45

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

For Band12: Antenna Gain = -0.65dBi = -2.80dBd (0dBd=2.15dBi)

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

Limit: ERP≤34.77dBm

LTE Band 13

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	24.02	23.79	23.87	20.66	20.43	20.51
		RB1#13	24.1	23.91	23.9	20.74	20.55	20.54
		RB1#24	24.09	23.87	23.79	20.73	20.51	20.43
		RB15#0	22.96	23.03	23.01	19.60	19.67	19.65
		RB15#10	22.95	23.03	23.02	19.59	19.67	19.66
		RB25#0	22.89	23.03	23.02	19.53	19.67	19.66
	16QAM	RB1#0	22.83	22.86	22.27	19.47	19.50	18.91
		RB1#13	22.86	22.90	22.19	19.50	19.54	18.83
		RB1#24	22.96	22.93	22.11	19.60	19.57	18.75
		RB15#0	21.82	21.87	22.02	18.46	18.51	18.66
		RB15#10	21.89	21.93	22.22	18.53	18.57	18.86
		RB25#0	21.94	22.01	22.04	18.58	18.65	18.68
10.0	QPSK	RB1#0	/	23.97	/	/	20.61	/
		RB1#25	/	24.00	/	/	20.64	/
		RB1#49	/	23.84	/	/	20.48	/
		RB25#0	/	22.95	/	/	19.59	/
		RB25#25	/	23.01	/	/	19.65	/
		RB50#0	/	23.07	/	/	19.71	/
	16QAM	RB1#0	/	23.63	/	/	20.27	/
		RB1#25	/	23.61	/	/	20.25	/
		RB1#49	/	23.65	/	/	20.29	/
		RB25#0	/	21.97	/	/	18.61	/
		RB25#25	/	22.05	/	/	18.69	/
		RB50#0	/	21.95	/	/	18.59	/

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

For Band13: Antenna Gain = -0.71dBi = -2.86dBd (0dBd=2.15dBi)

Cable Loss=0.58dB*(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	22.05	22.06	22.58	20.87	20.88	21.40
		RB1#13	22.04	22.08	22.48	20.86	20.90	21.30
		RB1#24	22.12	22.03	22.53	20.94	20.85	21.35
		RB15#0	20.92	21.07	21.55	19.74	19.89	20.37
		RB15#10	21.03	21.01	21.69	19.85	19.83	20.51
		RB25#0	21.06	21.1	21.50	19.88	19.92	20.32
	16QAM	RB1#0	21.11	21.43	21.50	19.93	20.25	20.32
		RB1#13	21.14	21.4	21.55	19.96	20.22	20.37
		RB1#24	20.93	21.33	21.55	19.75	20.15	20.37
		RB15#0	20.1	20.23	20.88	18.92	19.05	19.70
		RB15#10	20.13	20.16	20.83	18.95	18.98	19.65
		RB25#0	20.22	20.27	20.46	19.04	19.09	19.28
10.0	QPSK	RB1#0	22.05	22.12	22.72	20.87	20.94	21.54
		RB1#25	22.14	22.09	22.54	20.96	20.91	21.36
		RB1#49	22.08	22.04	22.39	20.90	20.86	21.21
		RB25#0	20.93	21.16	21.58	19.75	19.98	20.40
		RB25#25	21.03	21.11	21.59	19.85	19.93	20.41
		RB50#0	20.58	20.62	21.16	19.40	19.44	19.98
	16QAM	RB1#0	21.22	21.00	21.36	20.04	19.82	20.18
		RB1#25	21.24	20.95	20.82	20.06	19.77	19.64
		RB1#49	21.43	21.00	20.82	20.25	19.82	19.64
		RB25#0	20.33	20.42	19.79	19.15	19.24	18.61
		RB25#25	20.26	20.44	19.77	19.08	19.26	18.59
		RB50#0	19.9	19.82	19.27	18.72	18.64	18.09

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	21.31	21.21	21.77	20.13	20.03	20.59
		RB1#38	21.31	21.23	21.8	20.13	20.05	20.62
		RB1#74	21.22	21.26	21.93	20.04	20.08	20.75
		RB36#0	20.16	20.24	20.66	18.98	19.06	19.48
		RB36#39	20.08	20.22	20.59	18.90	19.04	19.41
		RB75#0	19.79	19.81	20.31	18.61	18.63	19.13
	16QAM	RB1#0	20.43	19.38	20.76	19.25	18.20	19.58
		RB1#38	20.49	19.56	20.86	19.31	18.38	19.68
		RB1#74	20.37	19.55	20.84	19.19	18.37	19.66
		RB36#0	19.19	19.59	19.71	18.01	18.41	18.53
		RB36#39	19.11	19.52	19.65	17.93	18.34	18.47
		RB75#0	18.95	19.08	19.27	17.77	17.90	18.09
20.0	QPSK	RB1#0	21.14	21.41	21.54	19.96	20.23	20.36
		RB1#50	21.05	21.43	21.61	19.87	20.25	20.43
		RB1#99	21.01	21.42	21.73	19.83	20.24	20.55
		RB50#0	20.17	20.2	20.6	18.99	19.02	19.42
		RB50#50	19.99	20.24	20.66	18.81	19.06	19.48
		RB100#0	19.68	19.84	20.2	18.50	18.66	19.02
	16QAM	RB1#0	20.04	21.00	21.12	18.86	19.82	19.94
		RB1#50	20.01	21.02	20.30	18.83	19.84	19.12
		RB1#99	19.91	21.05	22.57	18.73	19.87	21.39
		RB50#0	19.23	19.41	20.58	18.05	18.23	19.40
		RB50#50	19.25	19.36	20.82	18.07	18.18	19.64
		RB100#0	18.71	18.90	20.35	17.53	17.72	19.17

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

For Band 41: Antenna Gain =-0.38dBi

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

Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)**Cellular Band 850**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	10.26	13
	Middle	9.10	13
	High	10.42	13

WCDMA Band 5

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.27	13
	Middle	3.40	13
	High	3.30	13
HSDPA (16QAM)	Low	3.85	13
	Middle	4.04	13
	High	4.20	13
HSUPA (BPSK)	Low	3.91	13
	Middle	3.97	13
	High	4.07	13
HSPA+	Low	4.66	13
	Middle	4.87	13
	High	4.72	13

PCS Band 1900

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	11.51	13
	Middle	9.36	13
	High	9.01	13

WCDMA Band 2

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.10	13
	Middle	2.94	13
	High	3.01	13
HSDPA (16QAM)	Low	4.55	13
	Middle	4.58	13
	High	4.62	13
HSUPA (BPSK)	Low	5.19	13
	Middle	5.29	13
	High	5.19	13
HSPA+	Low	5.04	13
	Middle	5.04	13
	High	5.98	13

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.88	5.97	5.97	13	Pass
QPSK (100RB Size)	6.13	6.81	6.93	13	Pass
16QAM (1RB Size)	6.59	6.84	5.41	13	Pass
16QAM (100RB Size)	6.63	5.34	4.91	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.06	4.74	5.19	13	Pass
QPSK (50RB Size)	5.51	5.54	5.58	13	Pass
16QAM (1RB Size)	5.71	5.74	5.87	13	Pass
16QAM (50RB Size)	6.38	6.47	6.44	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.39	4.94	5.22	13	Pass
QPSK (50RB Size)	5.58	5.67	5.51	13	Pass
16QAM (1RB Size)	5.74	5.71	5.96	13	Pass
16QAM (50RB Size)	6.35	6.51	6.41	13	Pass

LTE Band 13 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	/	3.72	/	13	Pass
QPSK (50RB Size)	/	4.87	/	13	Pass
16QAM (1RB Size)	/	5.03	/	13	Pass
16QAM (50RB Size)	/	5.80	/	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	8.55	7.71	6.56	13	Pass
QPSK (100RB Size)	7.42	8.70	7.77	13	Pass
16QAM (1RB Size)	7.35	8.38	8.36	13	Pass
16QAM (100RB Size)	7.35	7.79	6.45	13	Pass

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

Applicable Standard

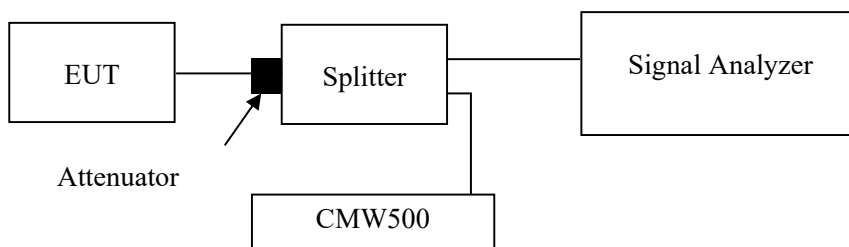
FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

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:	26~28.8 °C
Relative Humidity:	46.8~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-05-19 to 2023-06-03.

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	240.0	305.0
	190	836.6	239.0	313.0
	251	848.8	240.0	315.0

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.140	4.710
	836.4	4.140	4.710
	846.6	4.155	4.710
HSDPA	826.4	4.140	4.710
	836.4	4.155	4.695
	846.6	4.155	4.710
HSUPA	826.4	4.155	4.710
	836.4	4.140	4.695
	846.6	4.170	4.695

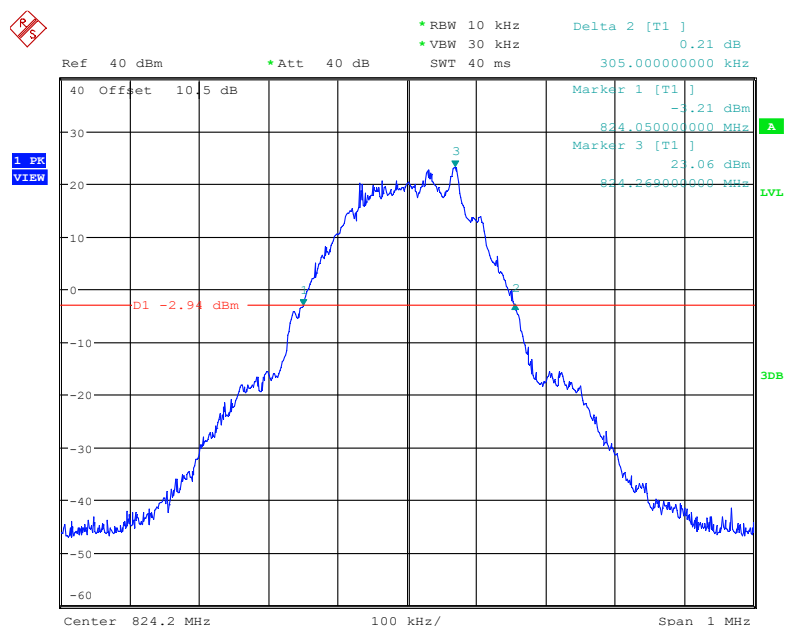
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	240.0	308.0
	661	1880.0	241.0	313.0
	810	1909.8	242.0	315.0

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.155	4.695
	1880.0	4.140	4.680
	1907.6	4.140	4.695
HSDPA	1852.4	4.140	4.695
	1880.0	4.155	4.695
	1907.6	4.155	4.695
HSUPA	1852.4	4.155	4.695
	1880.0	4.140	4.710
	1907.6	4.155	4.695

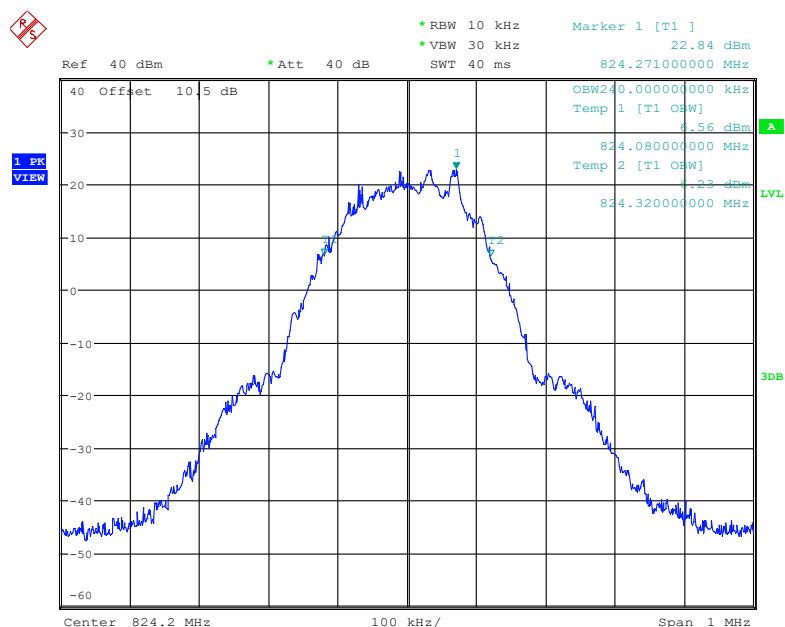
Cellular Band

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



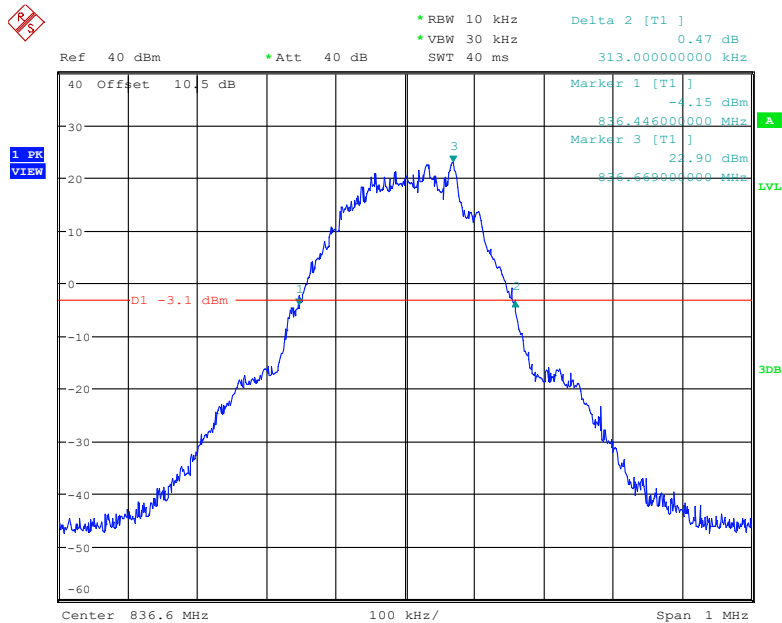
Date: 26.MAY.2023 19:56:42

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



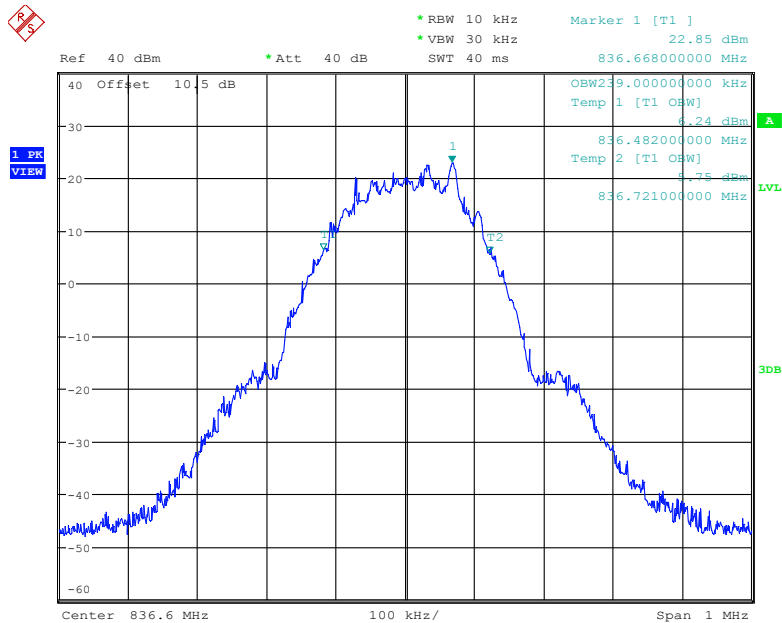
Date: 26.MAY.2023 19:55:50

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



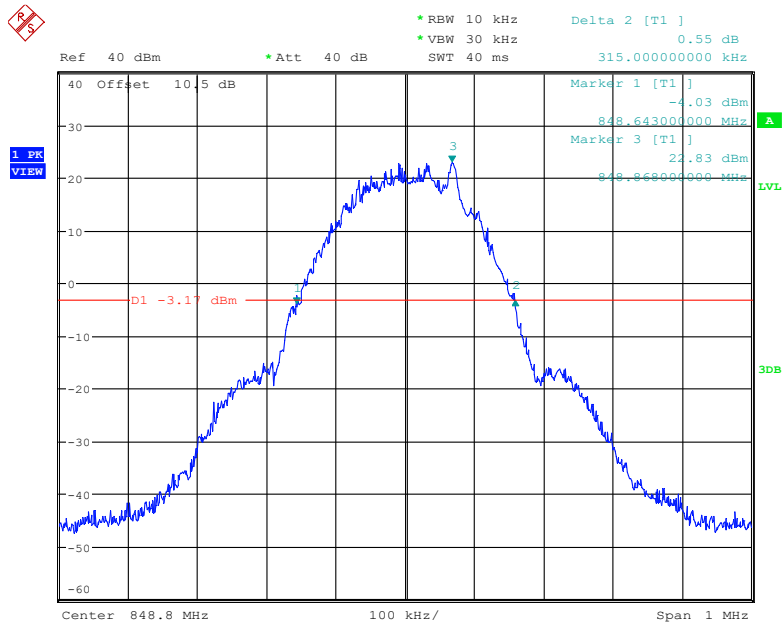
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99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



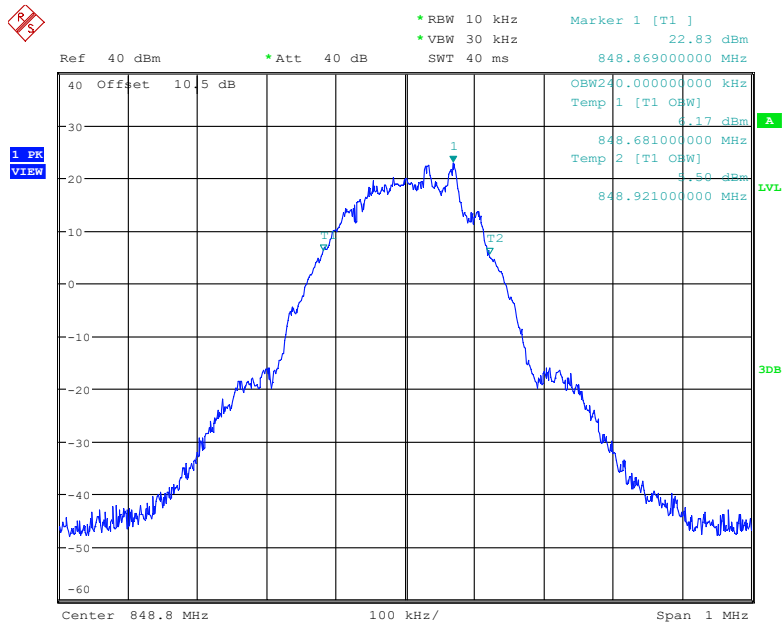
Date: 26.MAY.2023 19:50:08

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

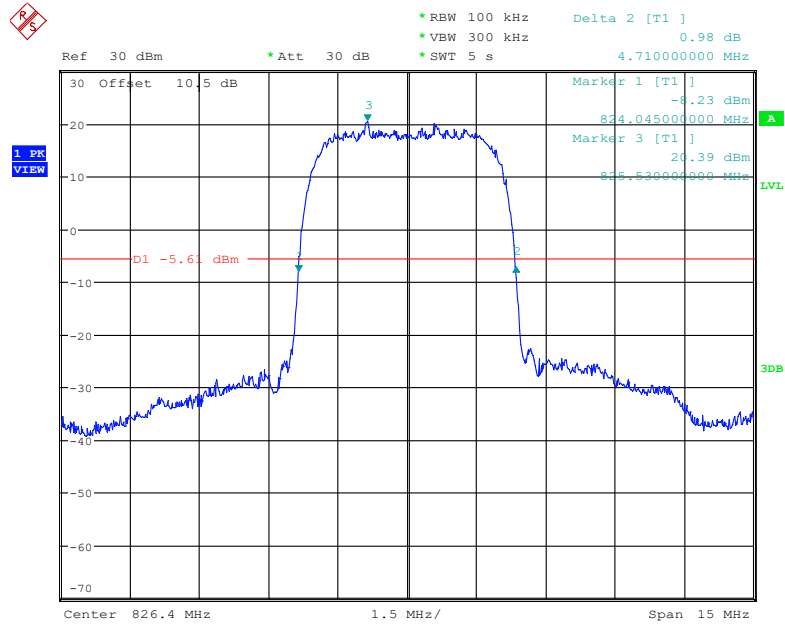


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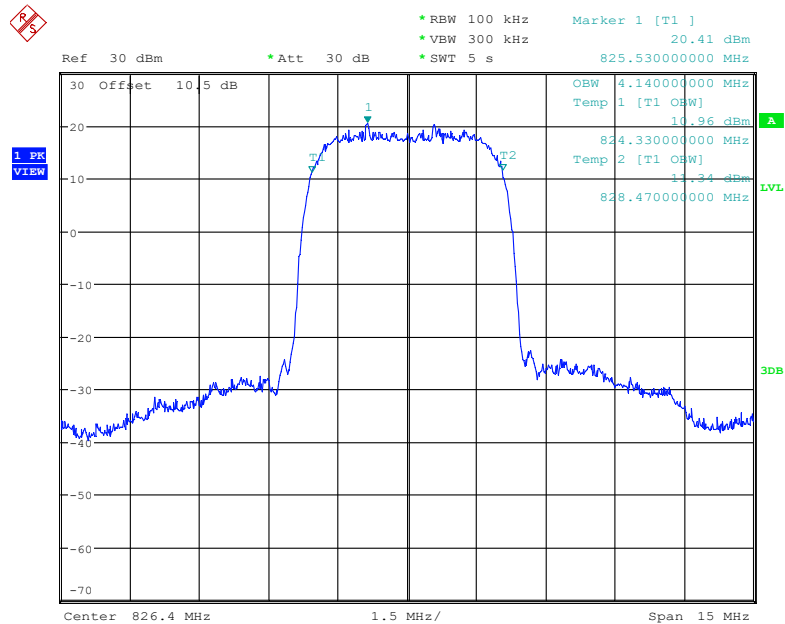
99% Occupied Bandwidth for GSM(GMSK) Mode, High channel



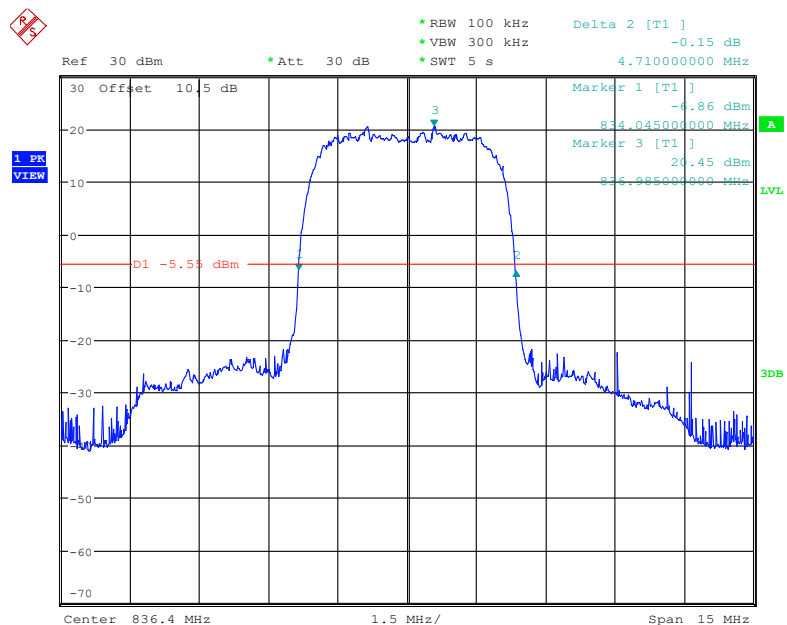
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26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel

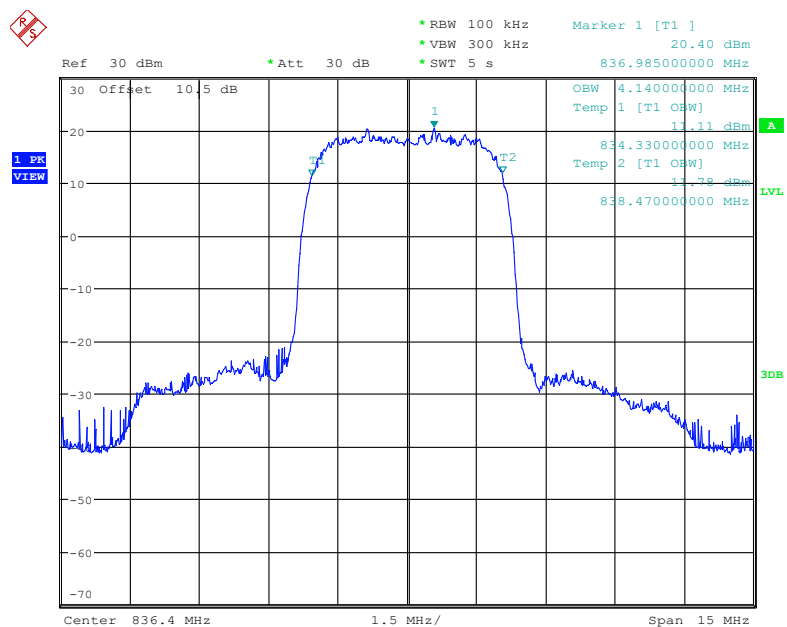
Date: 3.JUN.2023 21:56:13

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

Date: 3.JUN.2023 21:55:46

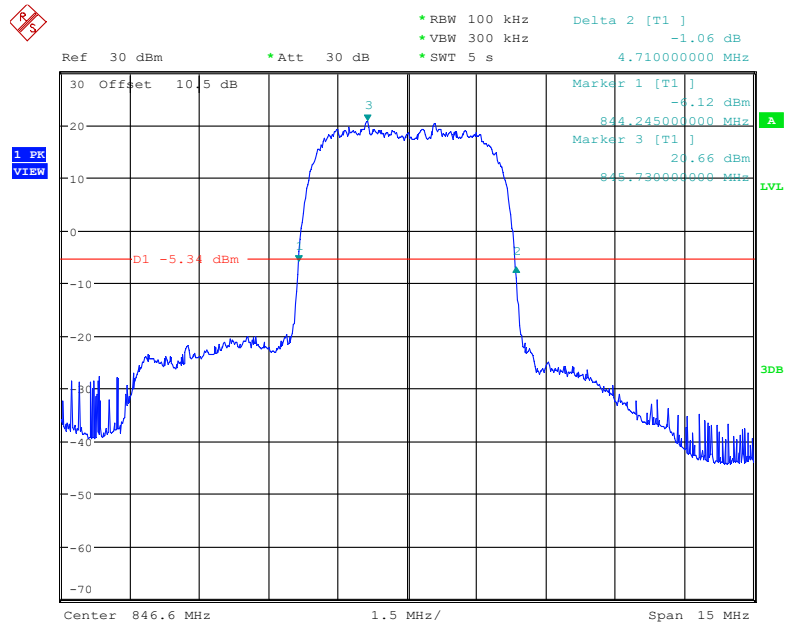
26 dB Emission Bandwidth for RMC (BPSK) Mode, Middle channel

Date: 3.JUN.2023 22:01:50

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

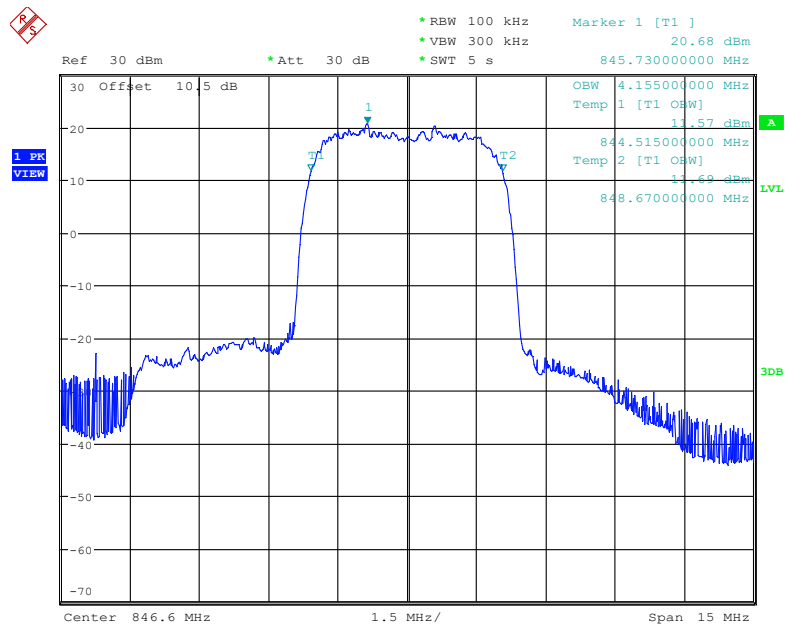
Date: 3.JUN.2023 21:59:37

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

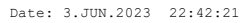


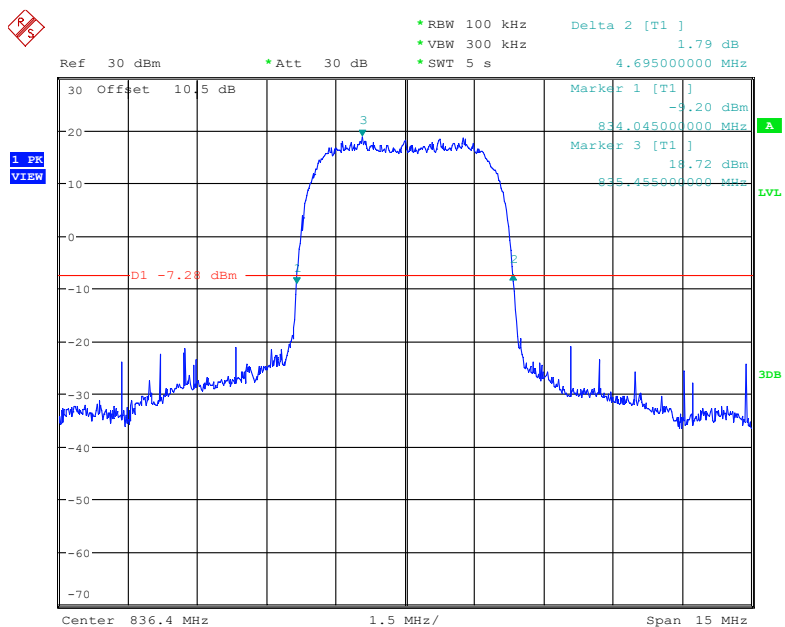
Date: 3.JUN.2023 22:08:54

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

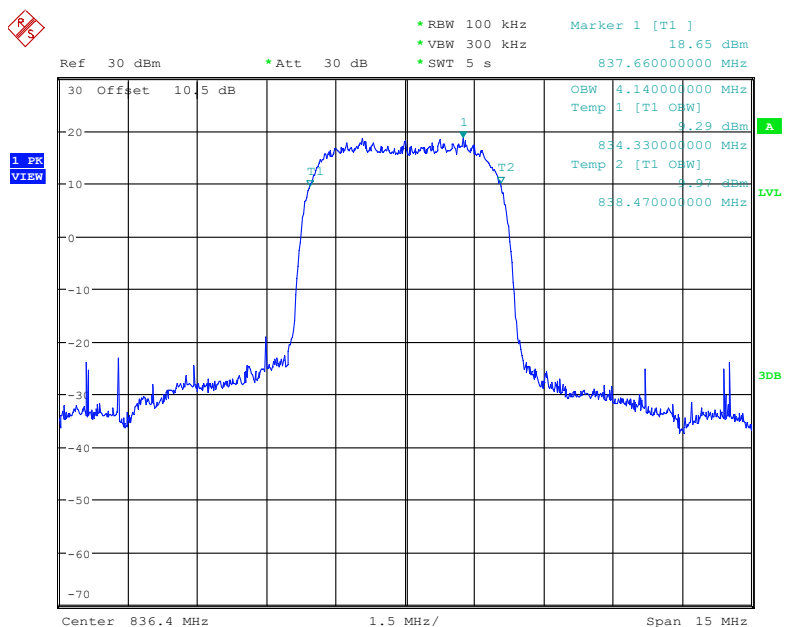


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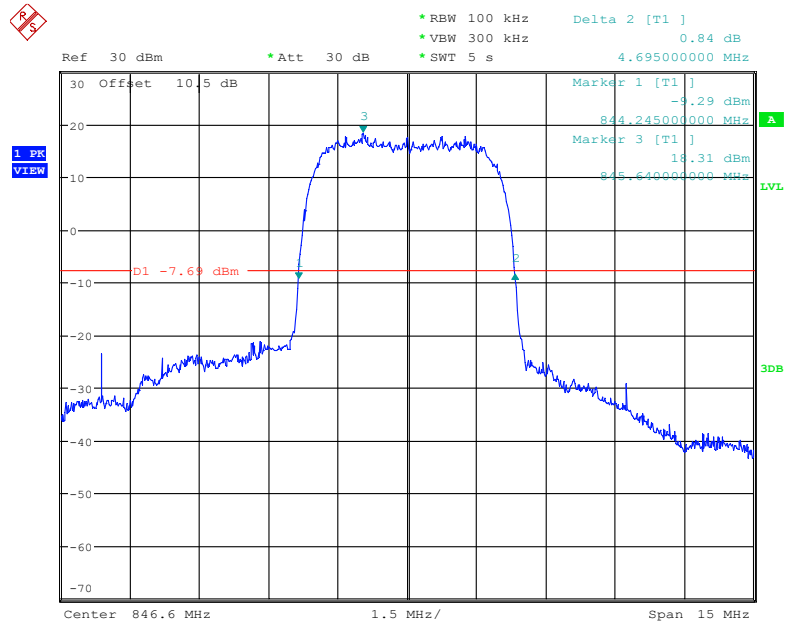


26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Middle channel

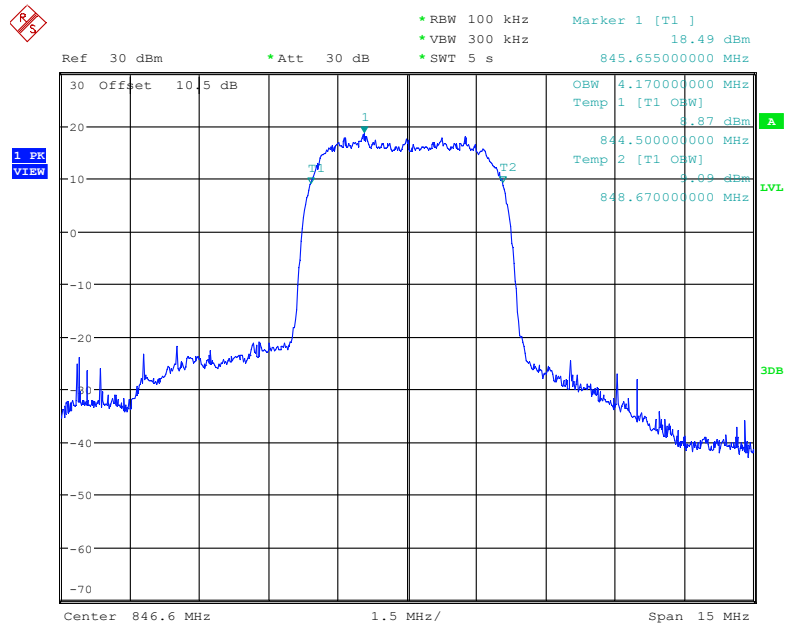
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99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

Date: 3.JUN.2023 22:45:39

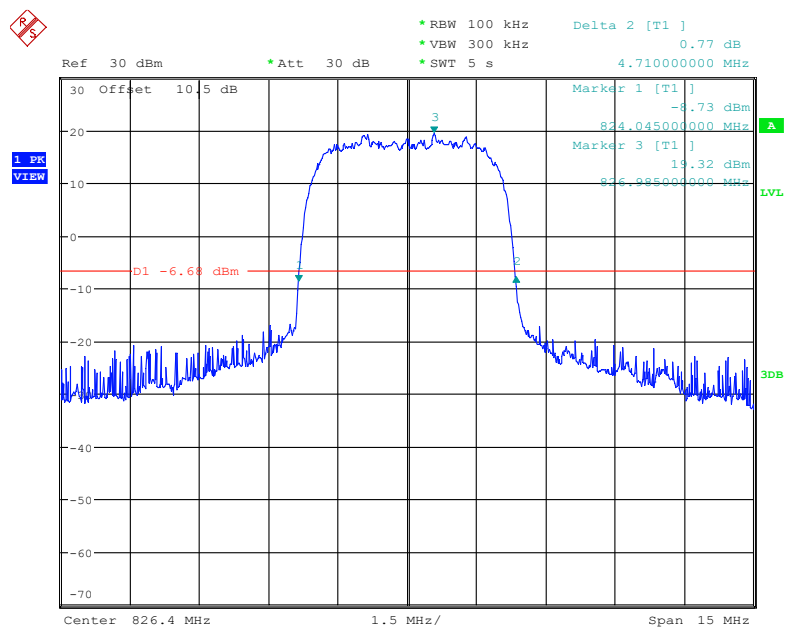
26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel

Date: 3.JUN.2023 22:49:31

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

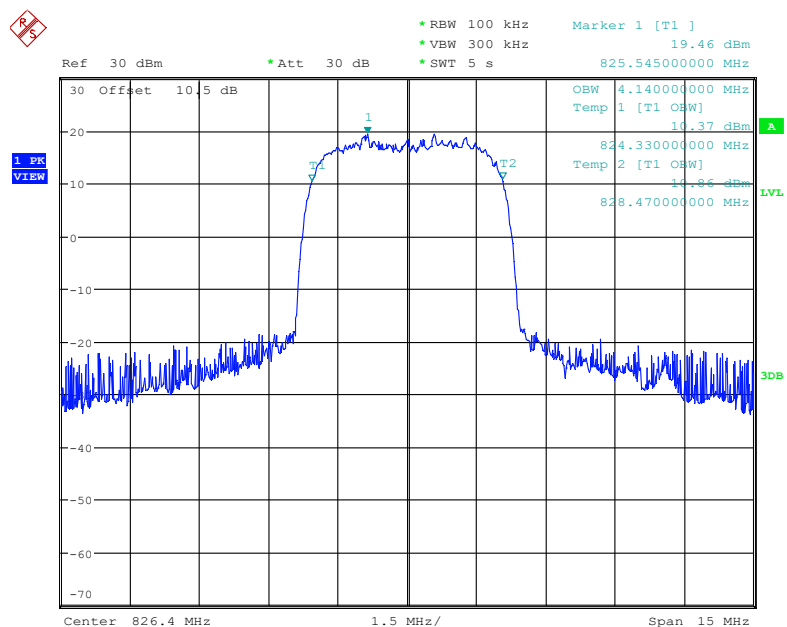
Date: 3.JUN.2023 22:48:50

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

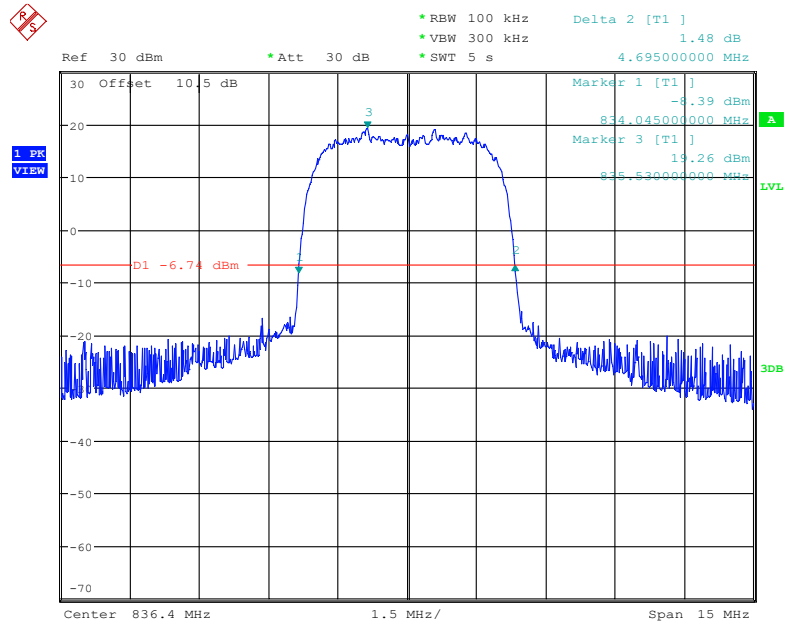


Date: 3.JUN.2023 22:19:16

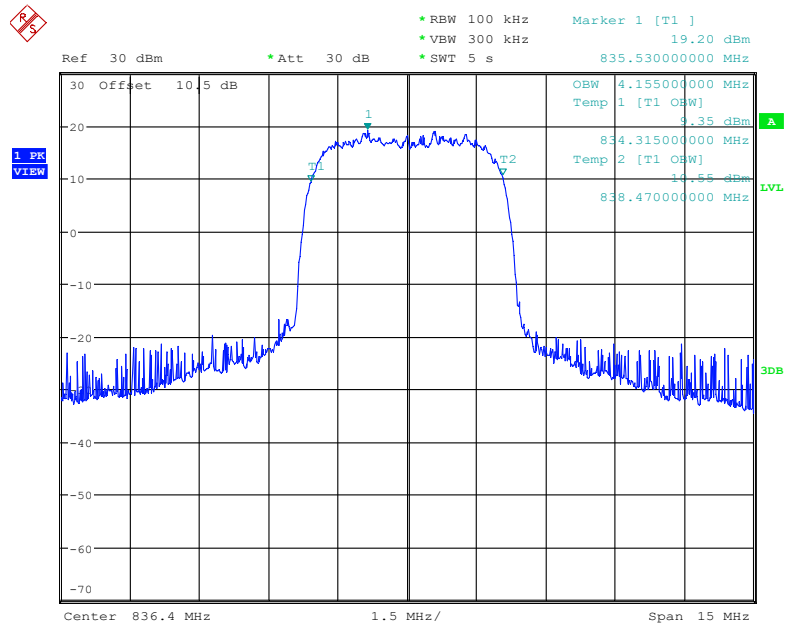
99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



Date: 3.JUN.2023 22:15:16

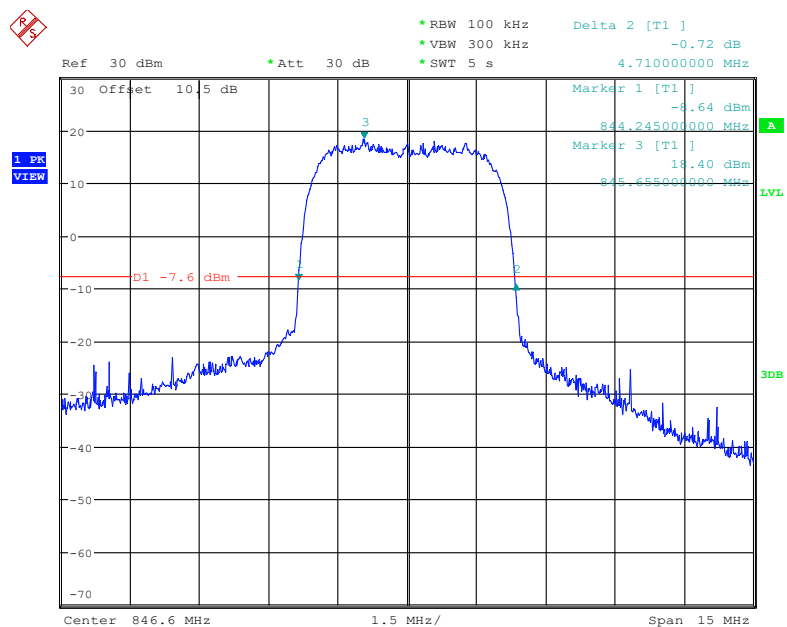
26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Middle channel

Date: 3.JUN.2023 22:29:41

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

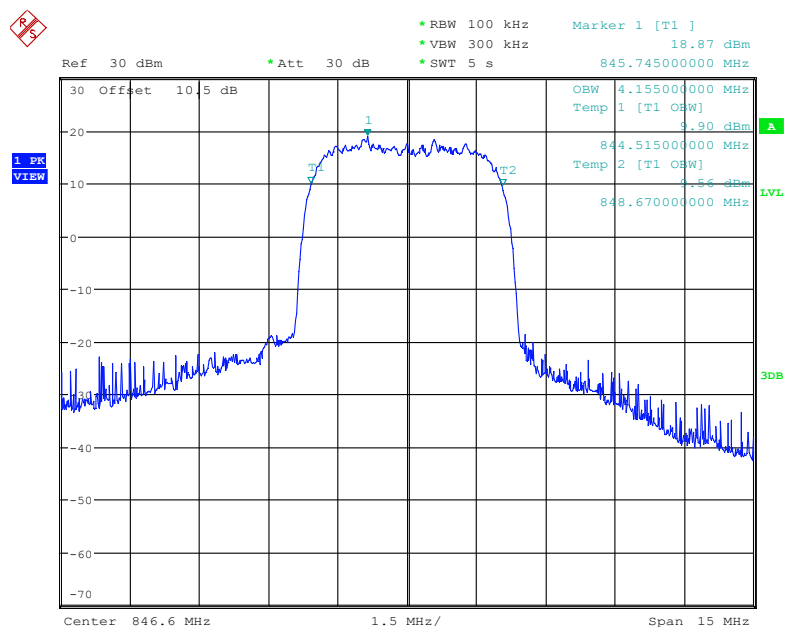
Date: 3.JUN.2023 22:24:41

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



Date: 3.JUN.2023 22:36:12

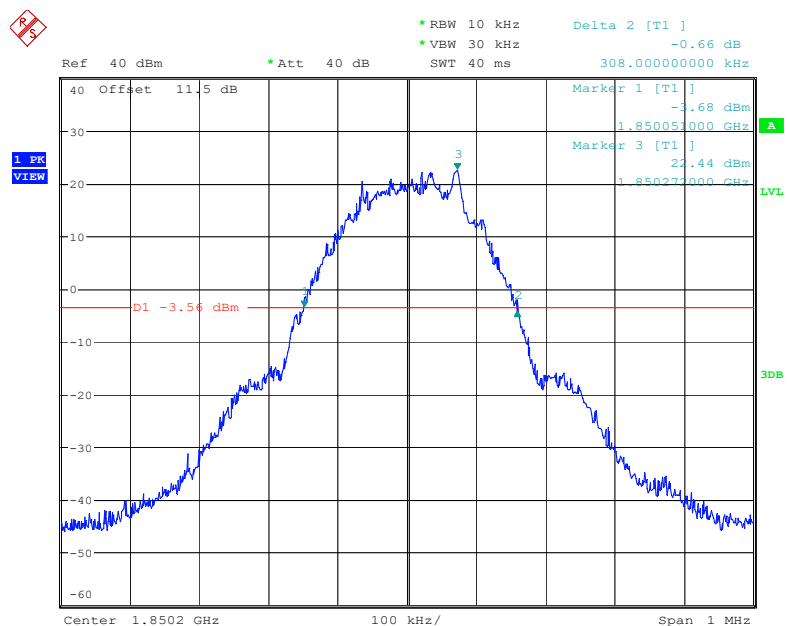
99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 3.JUN.2023 22:34:44

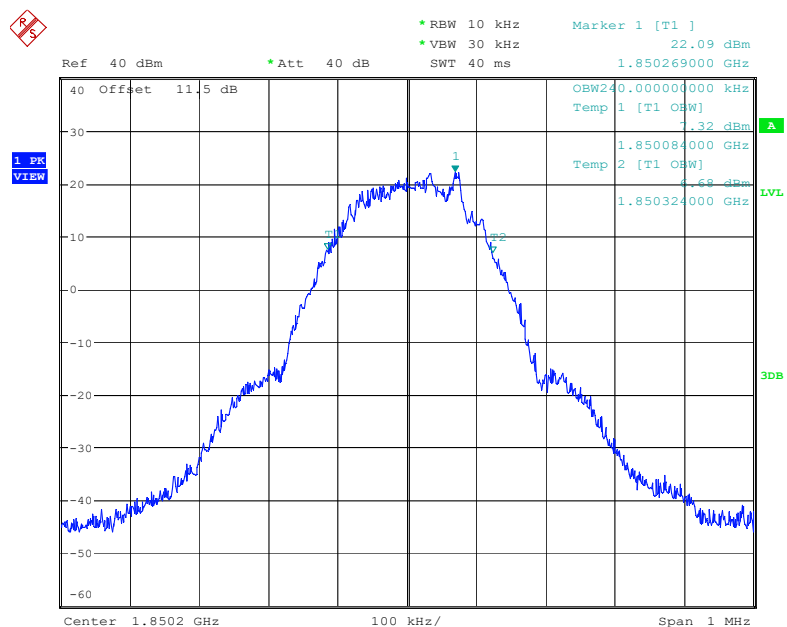
PCS Band

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

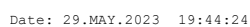
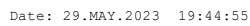


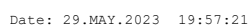
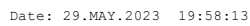
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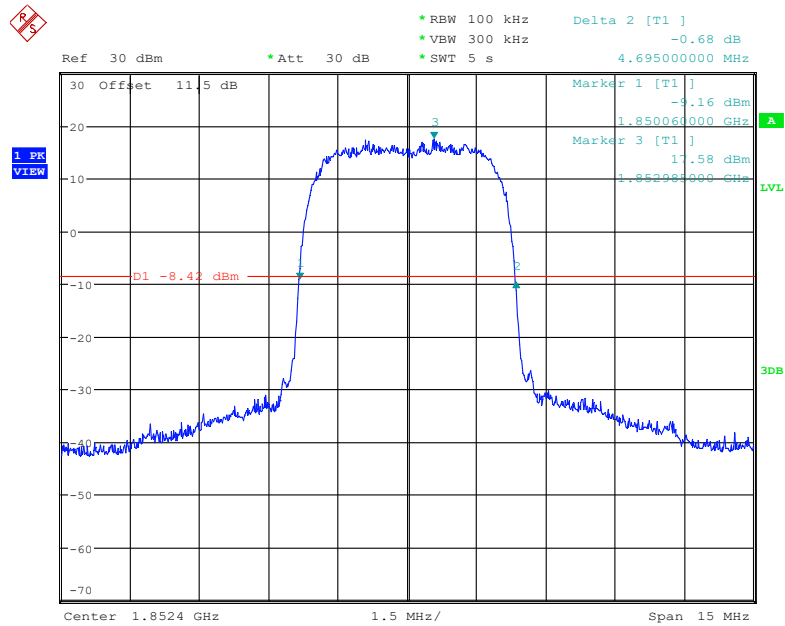
99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



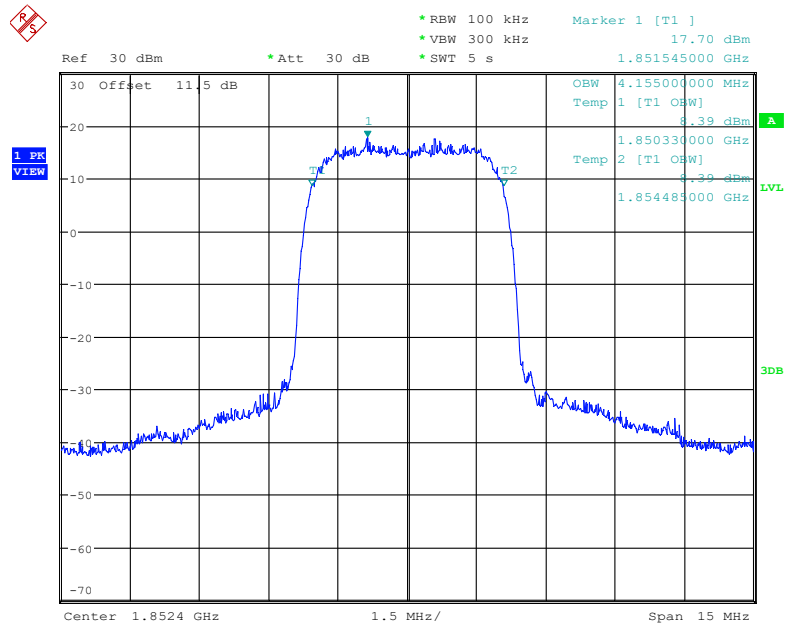
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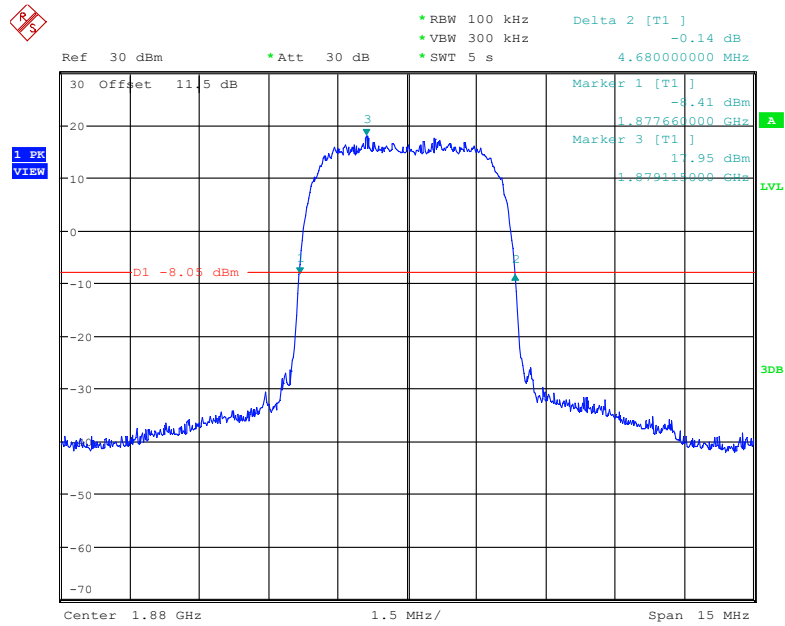


26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel

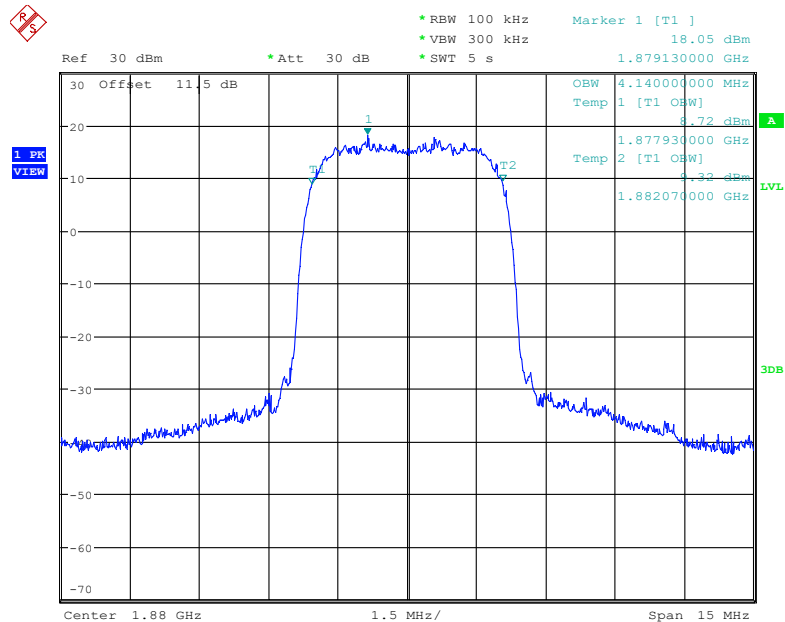
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99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel

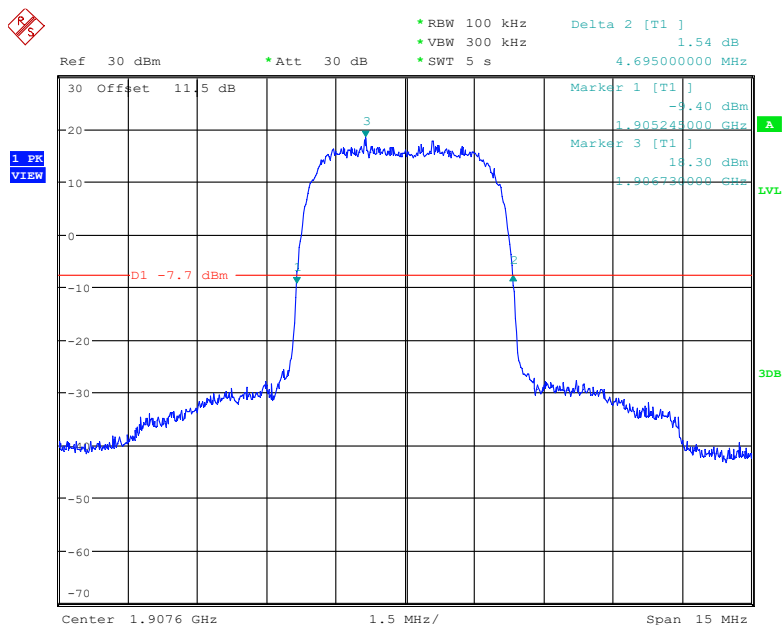
Date: 3.JUN.2023 20:10:44

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

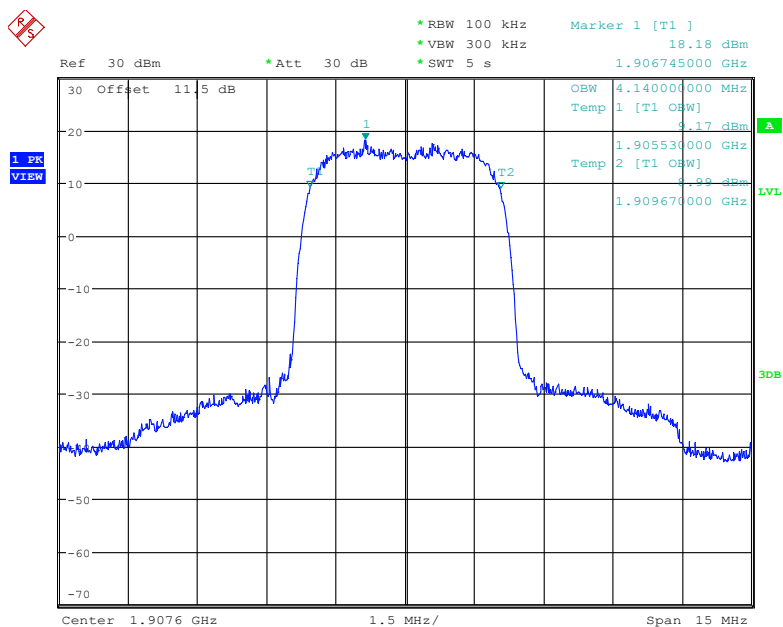
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99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

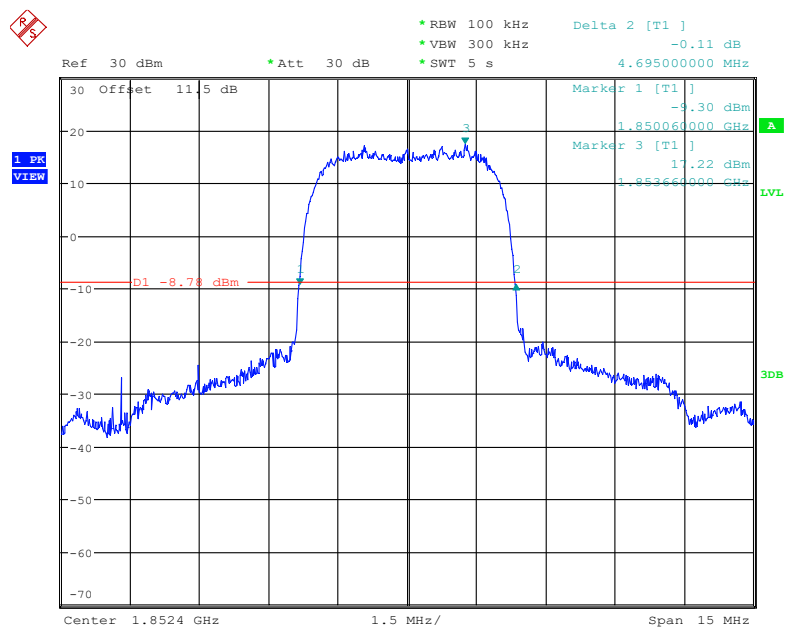
Date: 3.JUN.2023 20:12:59

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

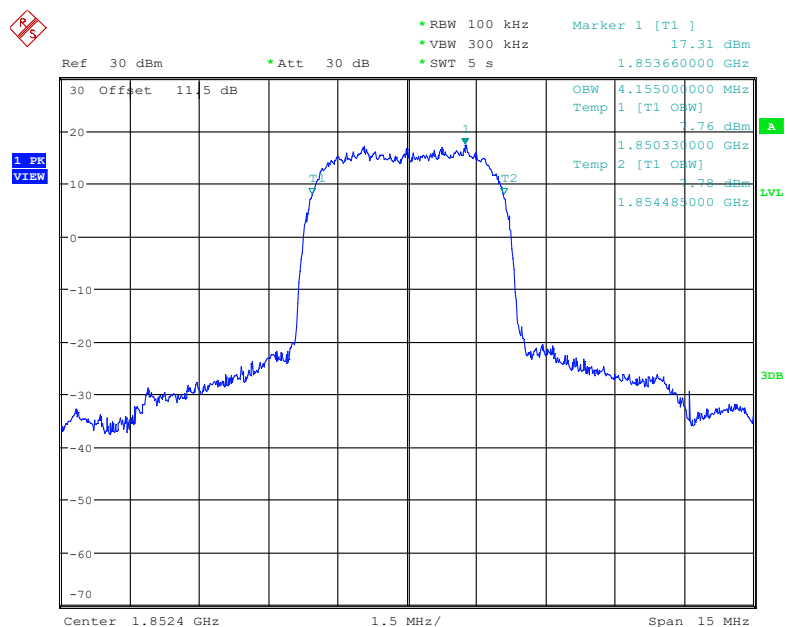
Date: 3.JUN.2023 20:15:14

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

Date: 3.JUN.2023 20:14:48

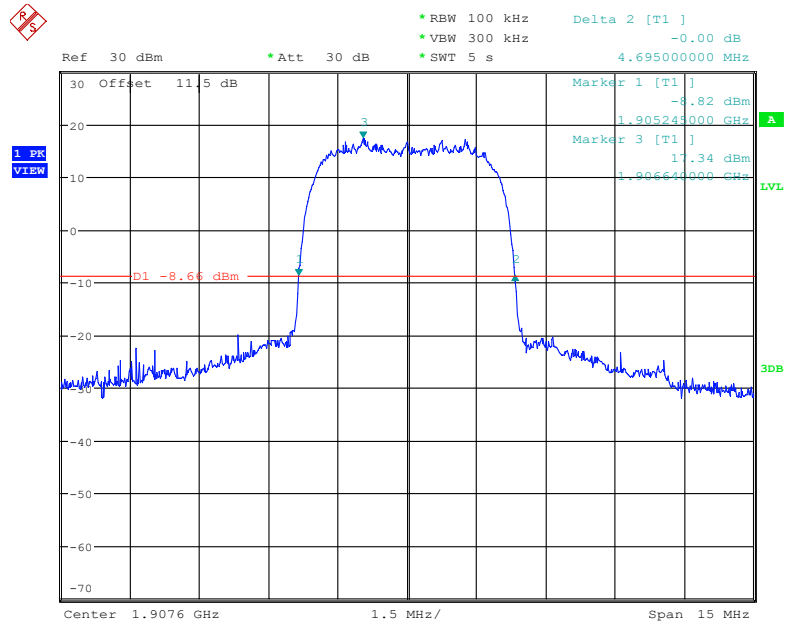
26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Low channel

Date: 3.JUN.2023 20:25:21

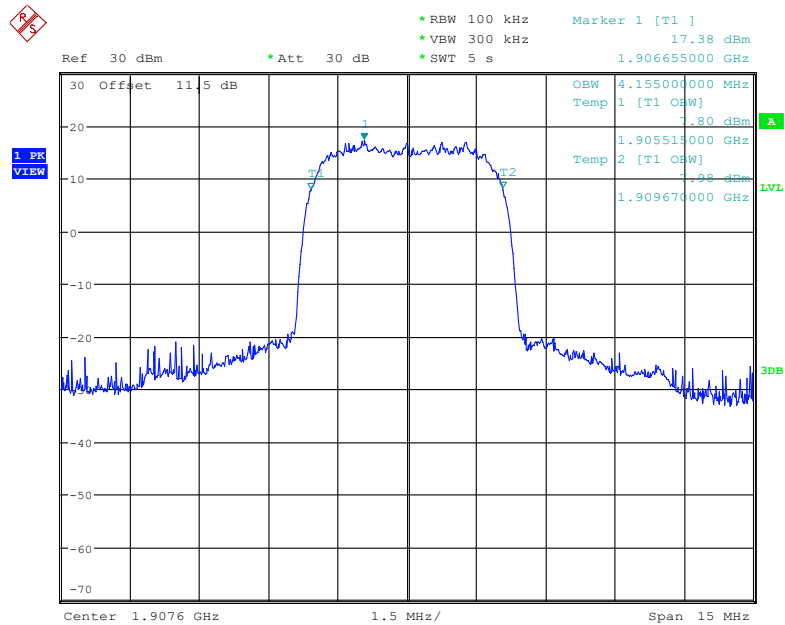
99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

Date: 3.JUN.2023 20:24:39

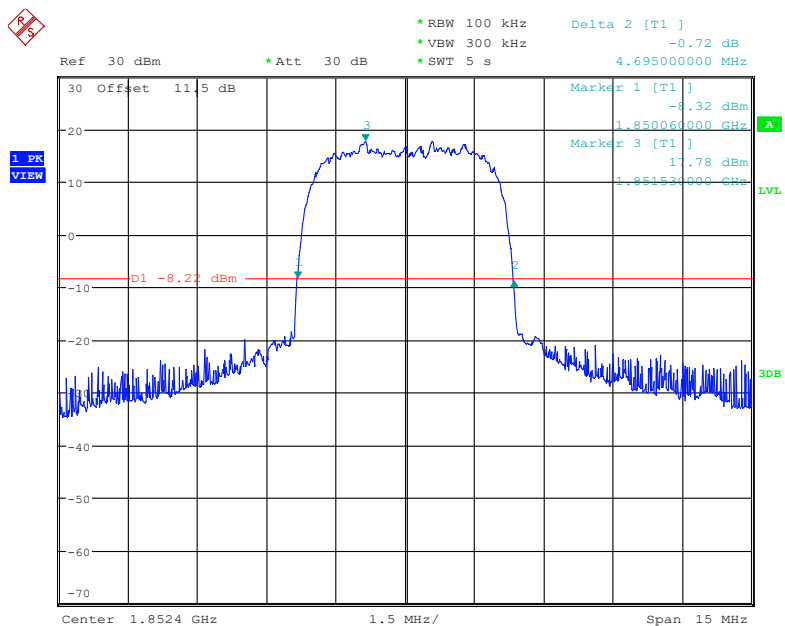


26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel

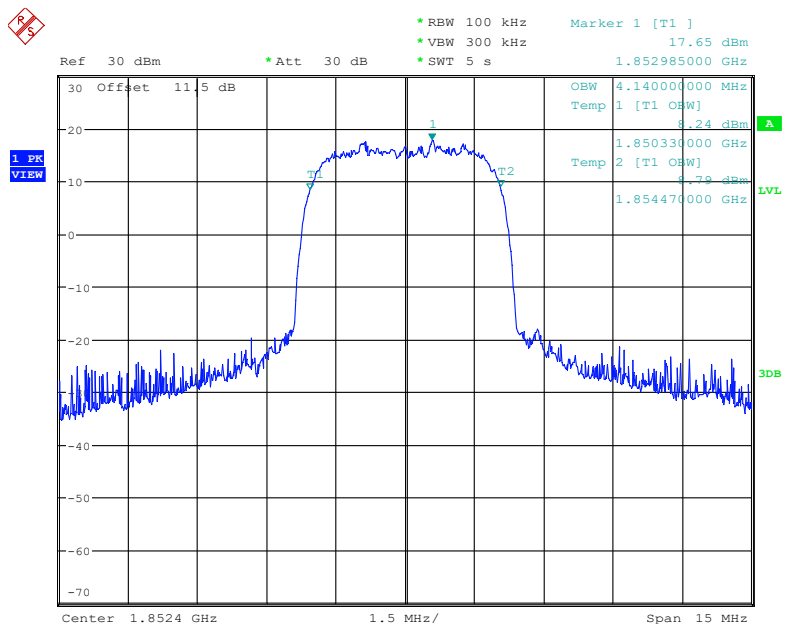
Date: 3.JUN.2023 20:34:47

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

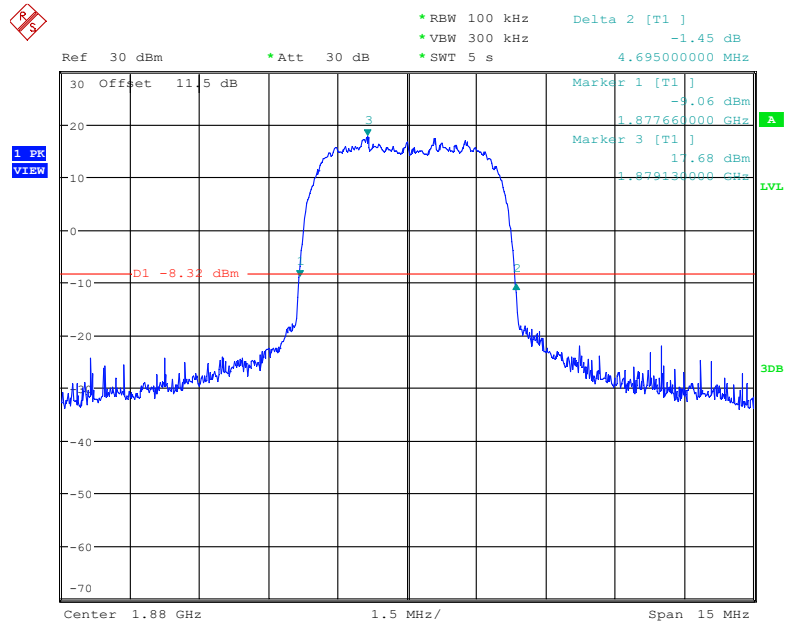
Date: 3.JUN.2023 20:33:50

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

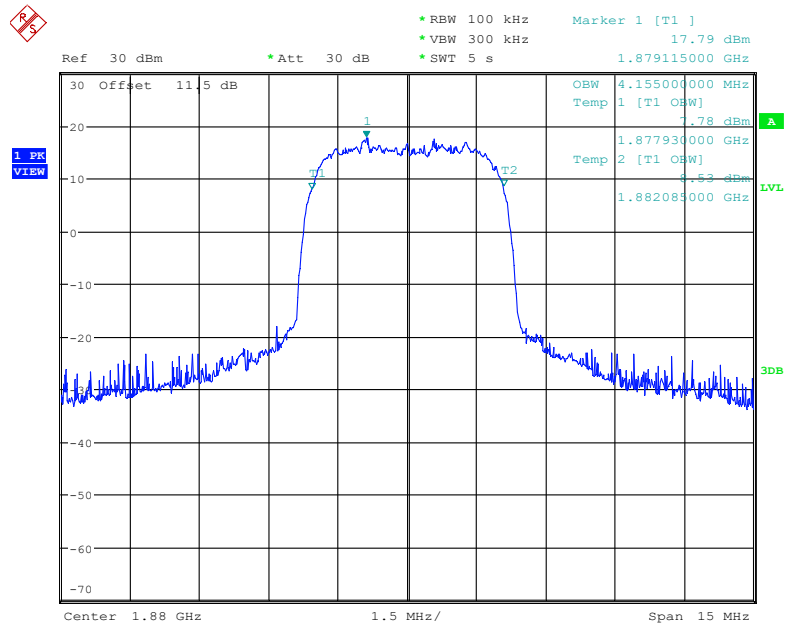
Date: 3.JUN.2023 21:05:48

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

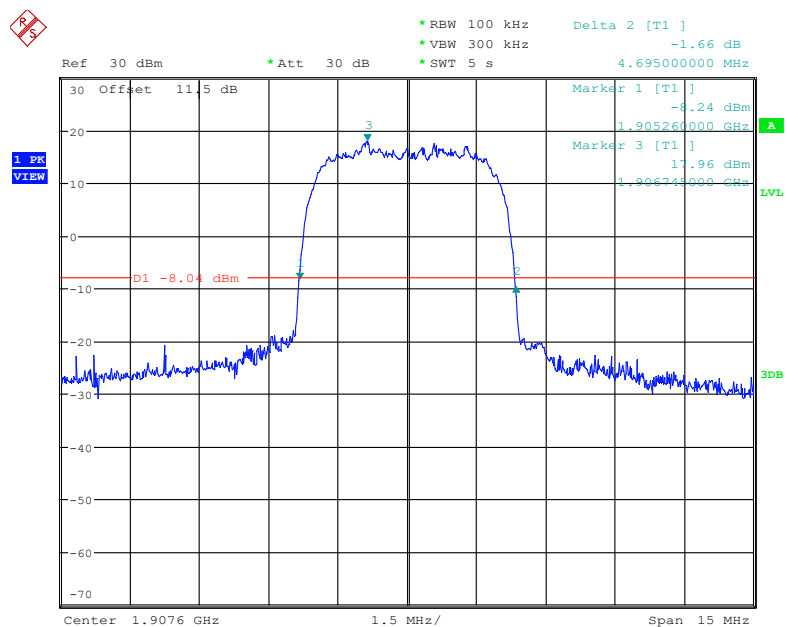
Date: 3.JUN.2023 21:00:32

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

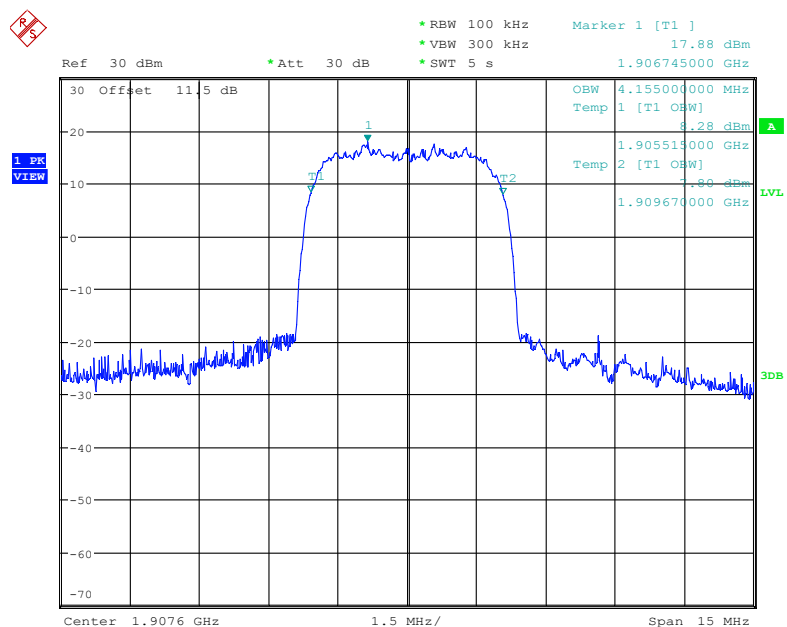
Date: 3.JUN.2023 21:12:41

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

Date: 3.JUN.2023 21:11:14

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

Date: 3.JUN.2023 21:18:58

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

Date: 3.JUN.2023 21:16:29

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	1.104	1.254	1.104	1.260	1.104	1.260
	16QAM	1.116	1.266	1.098	1.254	1.098	1.254
3 MHz	QPSK	2.700	3.012	2.700	3.012	2.700	2.976
	16QAM	2.700	3.012	2.700	3.024	2.700	3.012
5 MHz	QPSK	4.520	5.020	4.520	4.960	4.540	4.980
	16QAM	4.540	5.020	4.540	5.020	4.520	4.980
10 MHz	QPSK	8.960	9.760	8.960	9.800	8.960	9.760
	16QAM	8.960	9.760	8.960	9.840	8.960	9.800
15 MHz	QPSK	13.500	15.060	13.500	15.120	13.560	14.940
	16QAM	13.500	15.060	13.500	15.060	13.560	14.940
20 MHz	QPSK	18.000	19.600	18.080	19.840	17.920	19.520
	16QAM	18.080	19.840	18.080	19.760	18.000	19.600

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	1.104	1.260	1.098	1.260	1.104	1.254
	16QAM	1.110	1.266	1.098	1.254	1.104	1.260
3 MHz	QPSK	2.700	3.012	2.700	3.012	2.700	3.000
	16QAM	2.687	30.000	2.700	3.000	2.700	3.024
5 MHz	QPSK	4.520	5.040	4.520	4.980	4.520	5.000
	16QAM	4.520	5.000	4.520	4.980	4.520	5.000
10 MHz	QPSK	8.960	9.680	8.960	9.680	8.960	9.720
	16QAM	8.960	9.800	8.960	9.800	8.960	9.680

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	1.110	1.254	1.104	1.254	1.104	1.260
	16QAM	1.104	1.254	1.110	1.266	1.092	1.254
3 MHz	QPSK	2.700	3.000	2.700	3.012	2.700	3.000
	16QAM	2.687	2.988	2.687	3.024	2.700	3.024
5 MHz	QPSK	4.500	4.980	4.520	4.980	4.520	4.980
	16QAM	4.520	5.020	4.540	5.020	4.520	5.000
10 MHz	QPSK	8.960	9.680	9.000	9.800	8.920	9.680
	16QAM	8.960	9.760	9.000	9.800	8.920	9.760

LTE Band 13:

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	4.980	4.520	5.000	4.520	5.000	4.980
	16QAM	5.040	4.520	5.020	4.520	5.000	5.040
10 MHz	QPSK	/	/	8.920	9.640	/	/
	16QAM	/	/	8.920	9.640	/	/

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	4.520	4.980	4.520	5.160	4.520	5.160
	16QAM	4.520	5.080	4.500	4.980	4.520	5.080
10 MHz	QPSK	8.960	9.720	9.000	9.800	9.000	9.800
	16QAM	8.960	9.680	9.000	10.160	8.960	9.800
15 MHz	QPSK	13.500	15.600	13.560	15.360	13.620	15.120
	16QAM	13.560	15.360	13.560	16.620	13.560	15.240
20 MHz	QPSK	17.920	19.600	18.000	19.760	18.000	19.600
	16QAM	18.000	19.680	18.000	19.600	18.000	20.320

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

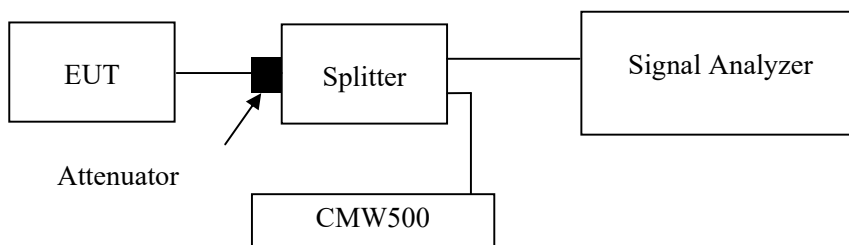
FCC §2.1051, §22.917(a) & §24.238(a)&§27.53.

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

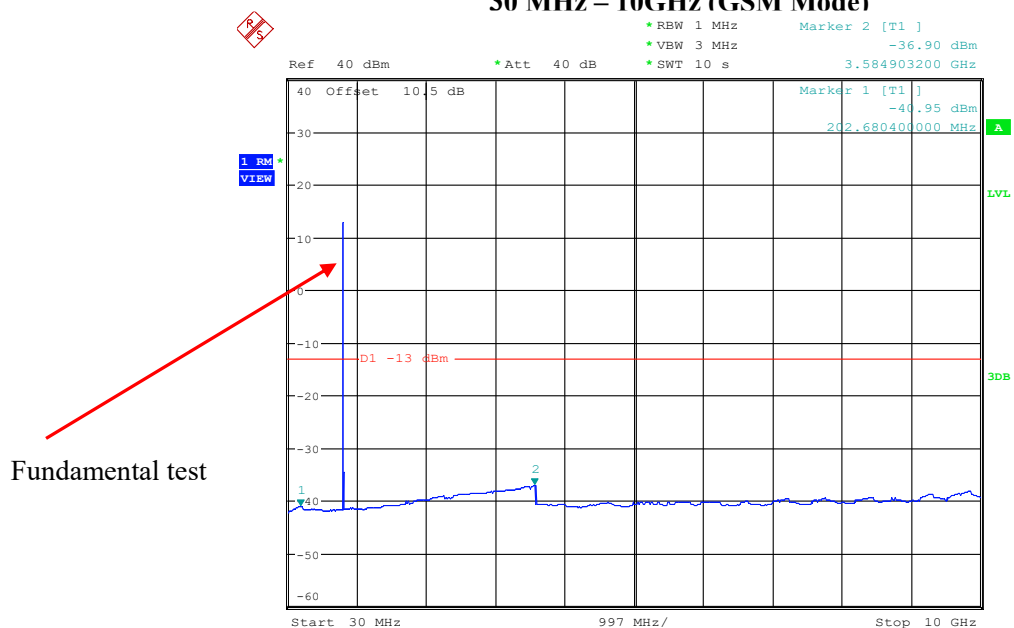
Temperature:	26~28.8 °C
Relative Humidity:	46.8~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-04-24 to 2023-05-23.

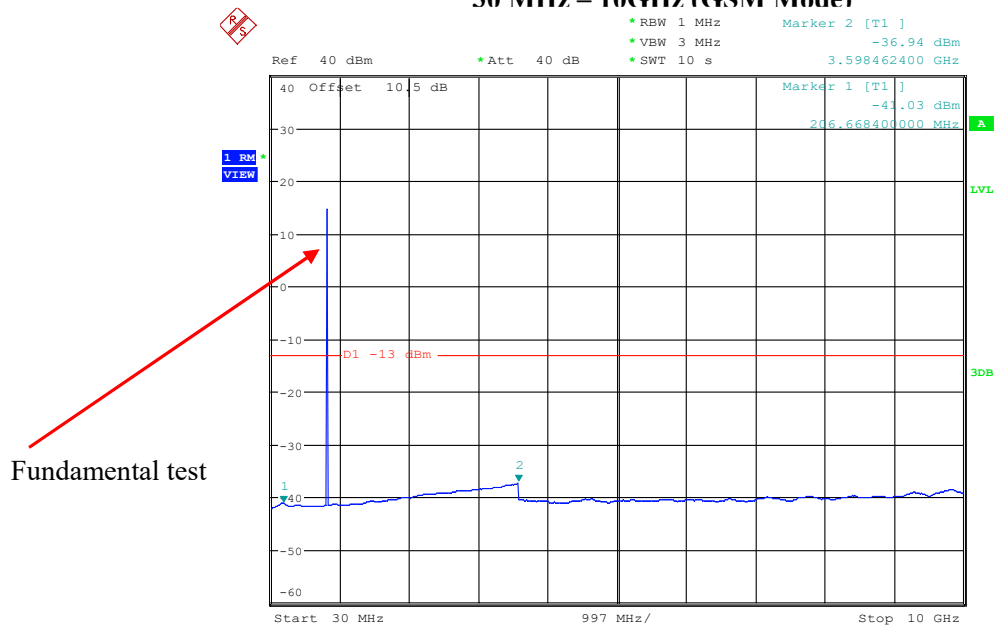
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

Cellular Band
Low Channel:**30 MHz – 10GHz (GSM Mode)**

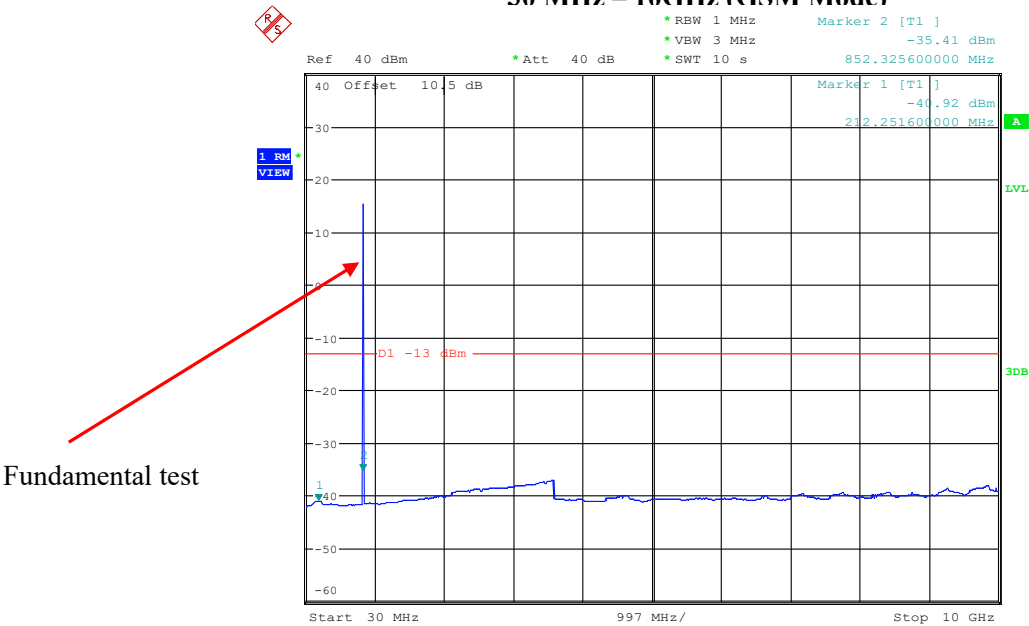
Date: 26.MAY.2023 19:59:47

Middle Channel:**30 MHz – 10GHz (GSM Mode)**

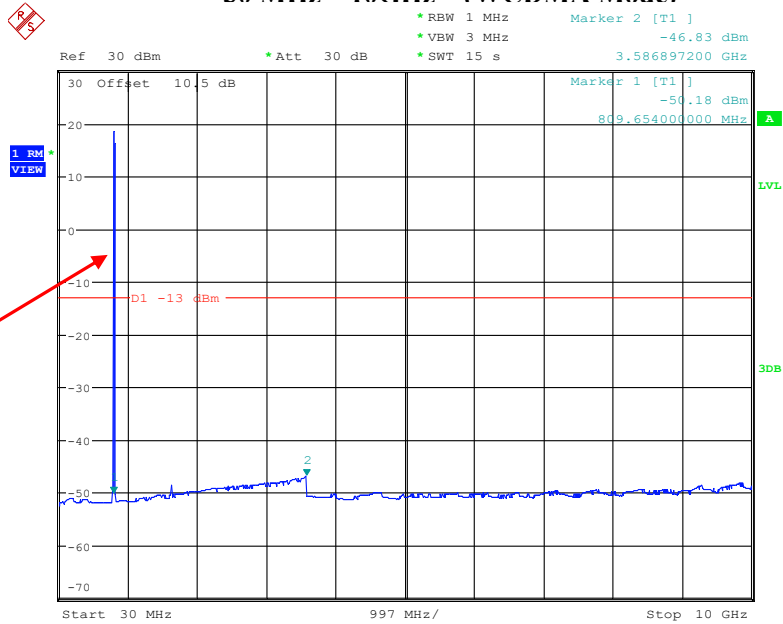
Date: 26.MAY.2023 19:08:20

High Channel:

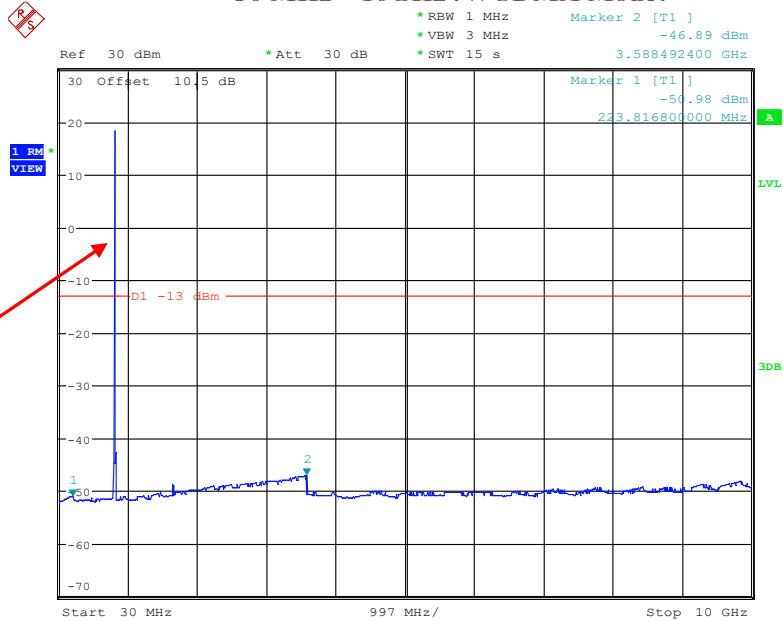
30 MHz – 10GHz (GSM Mode)



Date: 26.MAY.2023 20:05:43

Low Channel:**30 MHz – 10GHz (WCDMA Mode)**

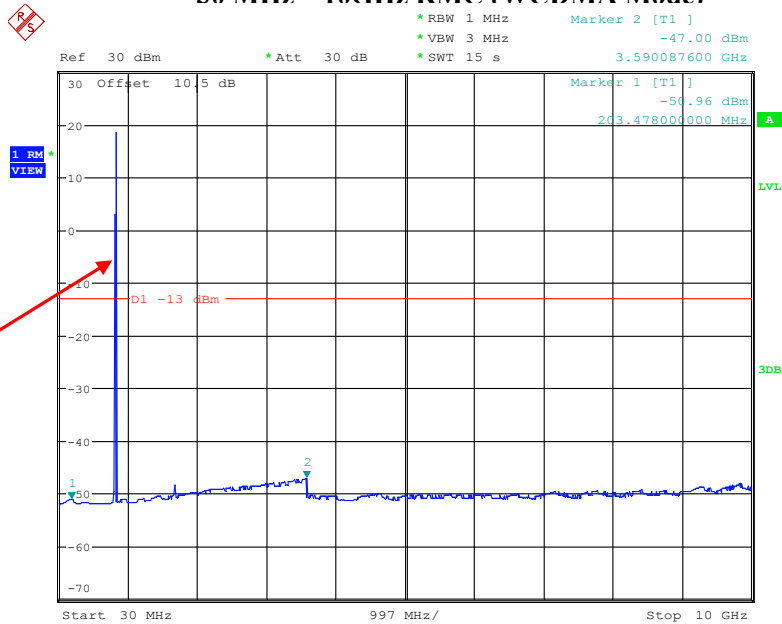
Date: 3.JUN.2023 21:57:28

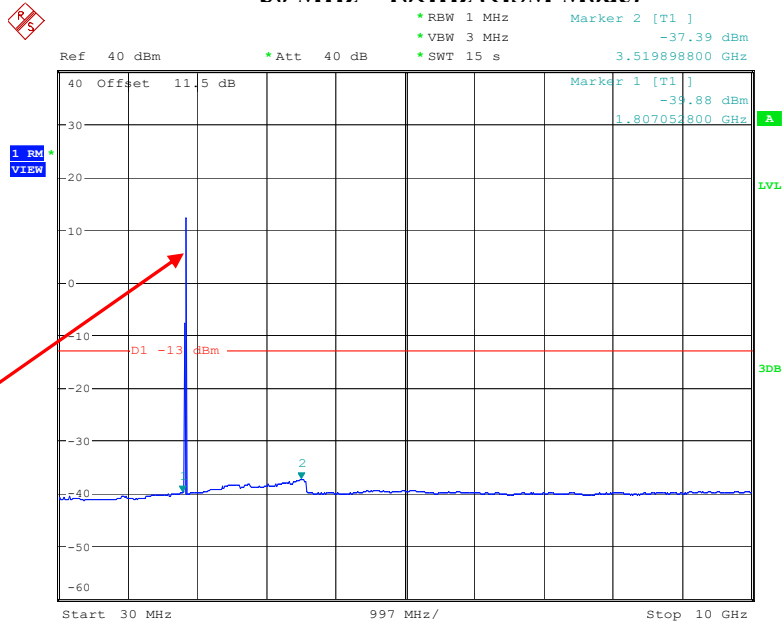
Middle Channel:**30 MHz – 10GHz (WCDMA Mode)**

Date: 3.JUN.2023 22:02:39

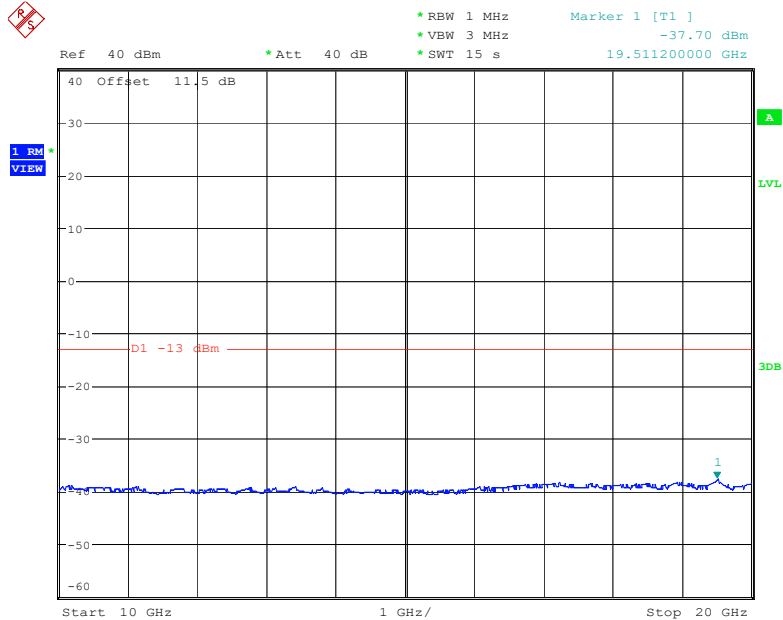
High Channel:

30 MHz – 10GHz RMC (WCDMA Mode)

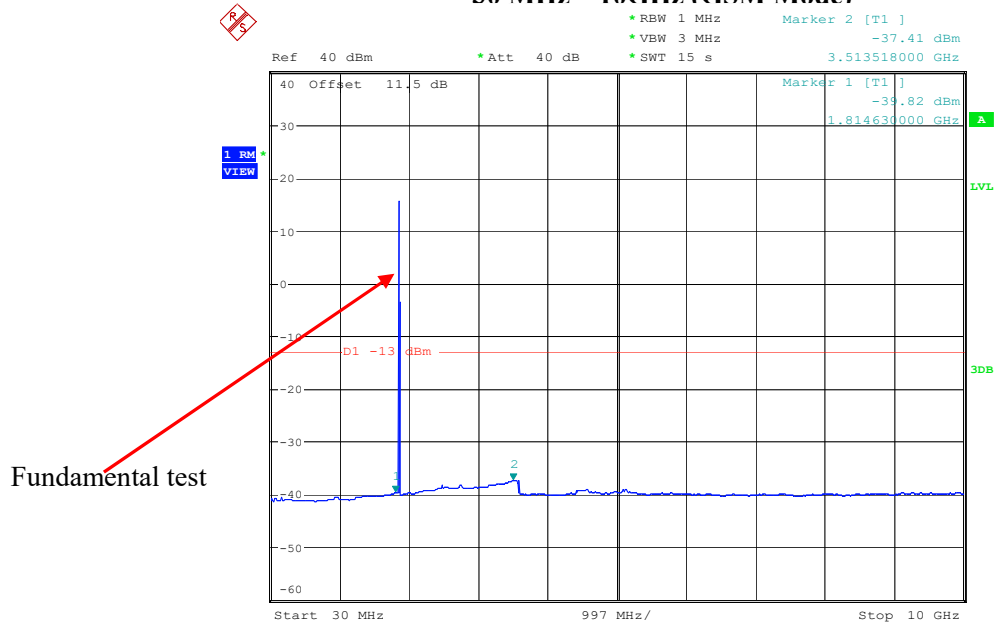


PCS Band**Low Channel:****30 MHz – 10GHz (GSM Mode)**

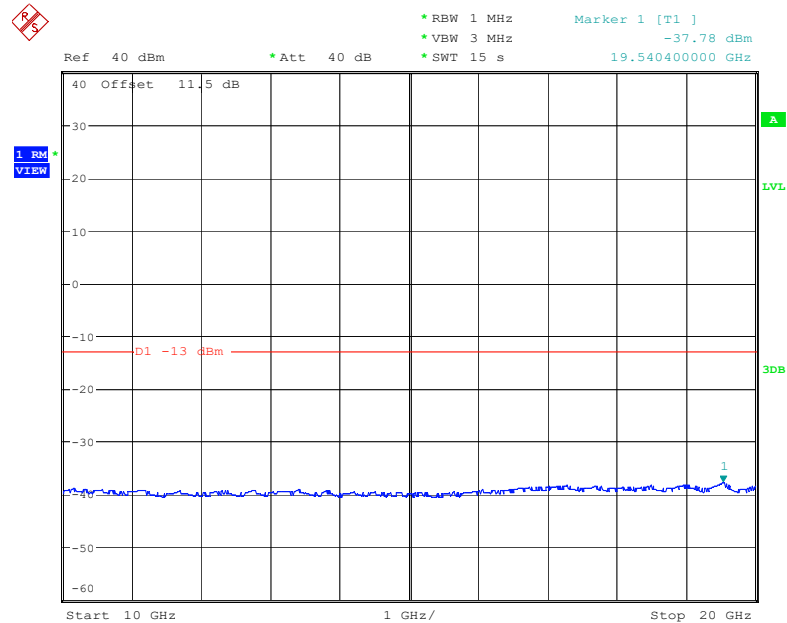
Date: 29.MAY.2023 19:54:05

10 GHz – 20GHz (GSM Mode)

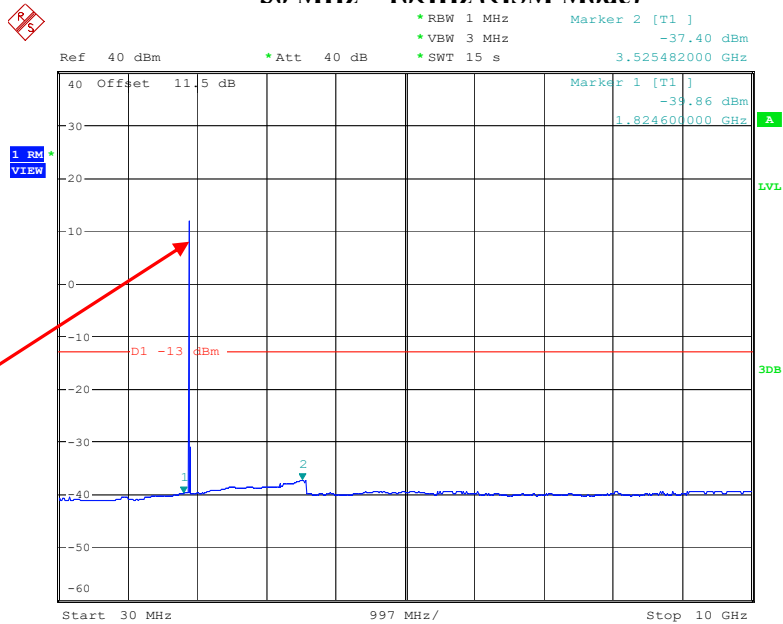
Date: 29.MAY.2023 19:54:54

Middle Channel:**30 MHz – 10GHz (GSM Mode)**

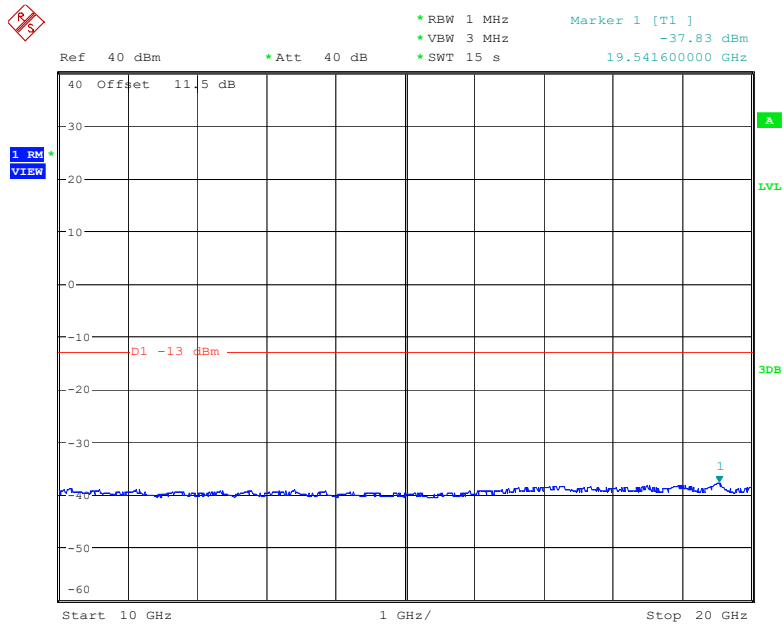
Date: 29.MAY.2023 19:46:54

10 GHz – 20GHz (GSM Mode)

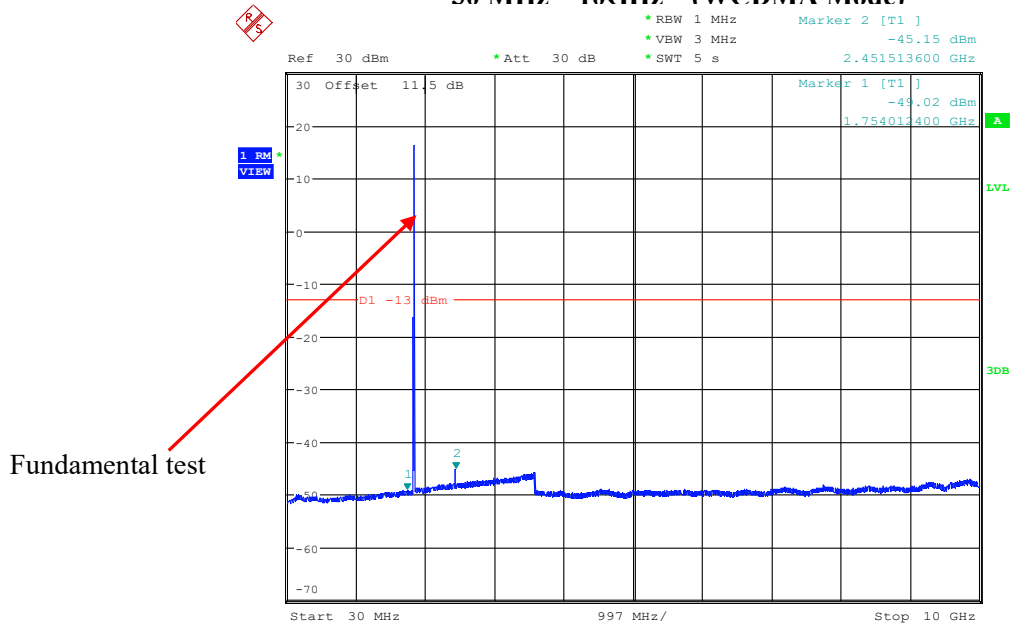
Date: 29.MAY.2023 19:47:43

High Channel:**30 MHz – 10GHz (GSM Mode)**

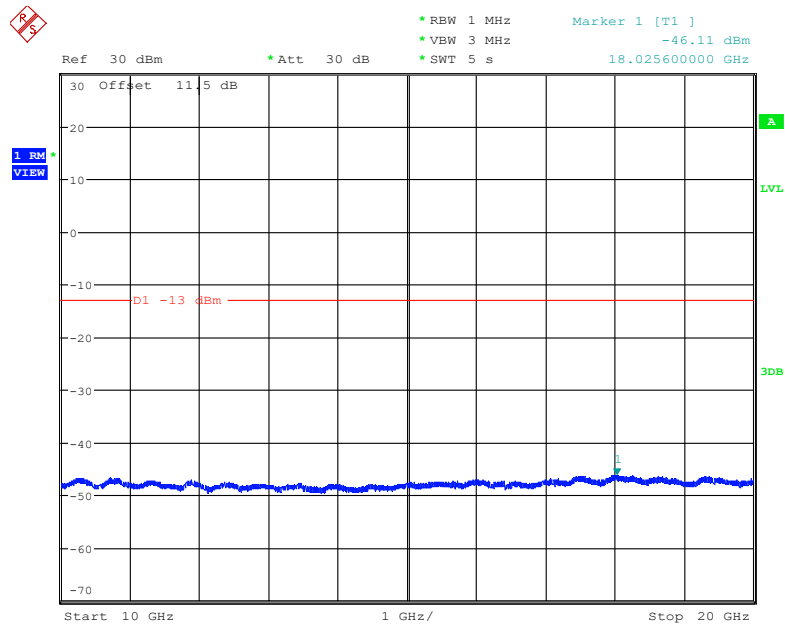
Date: 29.MAY.2023 20:01:45

10 GHz – 20GHz (GSM Mode)

Date: 29.MAY.2023 20:02:34

Low Channel:**30 MHz – 10GHz (WCDMA Mode)**

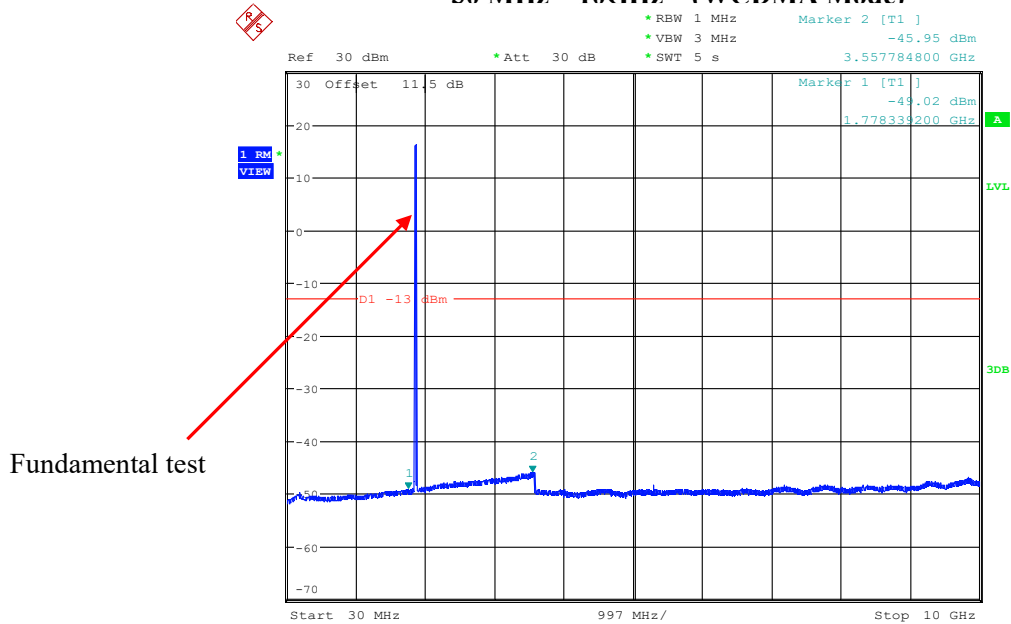
Date: 3.JUN.2023 20:12:05

10 GHz – 20GHz (WCDMA Mode)

Date: 3.JUN.2023 20:12:34

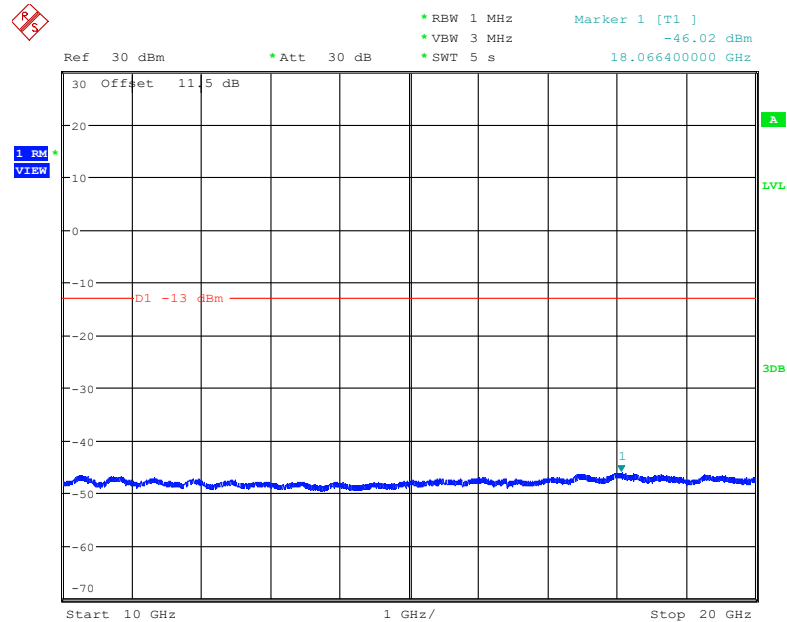
Middle Channel:

30 MHz – 10GHz (WCDMA Mode)

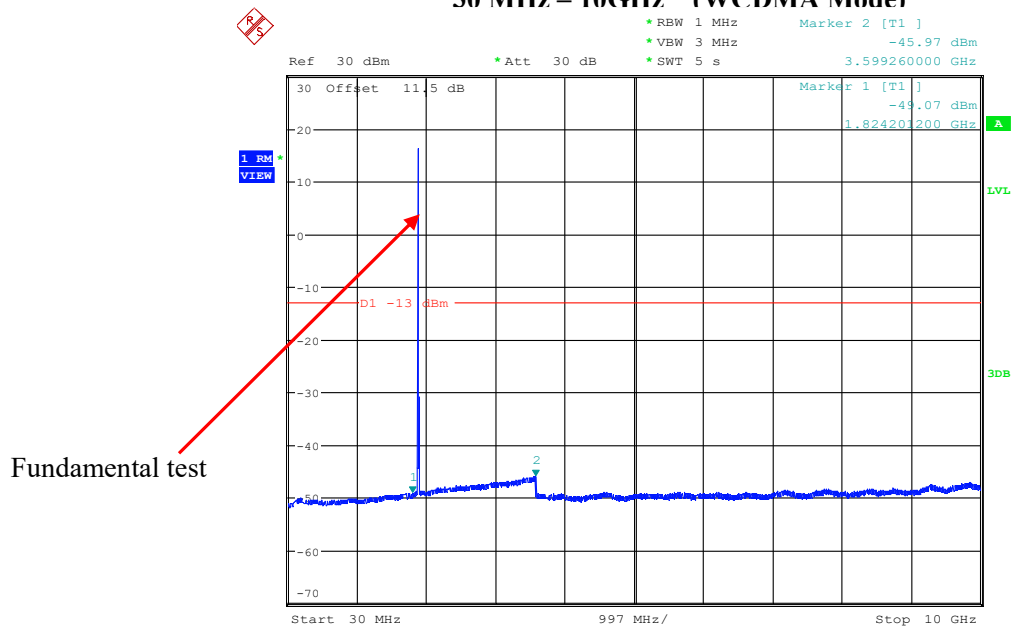


Date: 3.JUN.2023 20:13:54

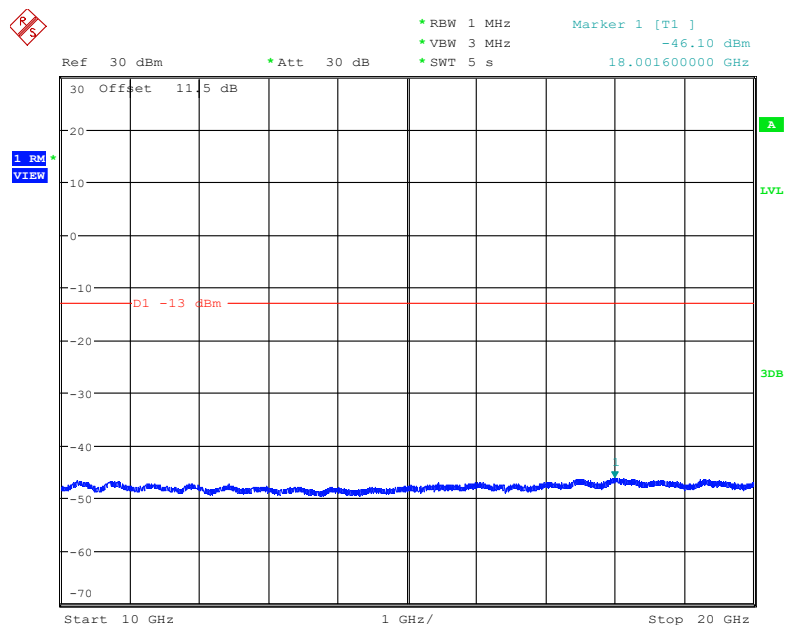
10 GHz – 20GHz (WCDMA Mode)



Date: 3.JUN.2023 20:14:23

High Channel:**30 MHz – 10GHz (WCDMA Mode)**

Date: 3.JUN.2023 20:16:10

10 GHz – 20GHz (WCDMA Mode)

Date: 3.JUN.2023 20:16:38

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:	25.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Jimi Zheng on 2023-05-26

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	-50.20	63	1.7	H	0.4	-49.80	-13	-36.80
1648.4	-51.20	246	1.8	V	0.1	-51.10	-13	-38.10
2472.6	-47.70	110	1.3	H	3.6	-44.10	-13	-31.10
2472.6	-47.00	38	1.2	V	4.2	-42.80	-13	-29.80
3296.8	-45.80	166	1.1	H	4.1	-41.70	-13	-28.70
3296.8	-45.60	39	1.3	V	4.4	-41.20	-13	-28.20
Middle channel								
1673.2	-48.90	5	1.3	H	0.5	-48.40	-13	-35.40
1673.2	-48.90	72	2.2	V	0.5	-48.40	-13	-35.40
2509.8	-47.20	162	1.2	H	3.6	-43.60	-13	-30.60
2509.8	-46.20	358	1.5	V	3.9	-42.30	-13	-29.30
3346.4	-45.60	300	1.9	H	4.1	-41.50	-13	-28.50
3346.4	-45.00	169	1.5	V	4.1	-40.90	-13	-27.90
High channel								
1697.6	-48.10	104	1.9	H	0.5	-47.60	-13	-34.60
1697.6	-48.40	178	2	V	0.9	-47.50	-13	-34.50
2546.4	-46.50	25	1.2	H	3.5	-43.00	-13	-30.00
2546.4	-45.50	10	1.8	V	3.8	-41.70	-13	-28.70
3395.2	-45.70	257	1.6	H	4.5	-41.20	-13	-28.20
3395.2	-45.70	154	1.3	V	5.1	-40.60	-13	-27.60

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
3700.4	-35.50	123	1.4	H	5.9	-29.60	-13	-16.60
3700.4	-36.00	147	1.3	V	6.4	-29.60	-13	-16.60
5550.6	-46.10	112	2.5	H	9.1	-37.00	-13	-24.00
5550.6	-46.70	210	1.7	V	9.5	-37.20	-13	-24.20
Middle channel								
3760.0	-35.80	158	2.2	H	6.2	-29.60	-13	-16.60
3760.0	-36.30	20	1.6	V	6.7	-29.60	-13	-16.60
5640.0	-45.70	65	2.2	H	9.1	-36.60	-13	-23.60
5640.0	-46.10	119	1.7	V	9.3	-36.80	-13	-23.80
High channel								
3819.6	-34.50	205	2	H	6.1	-28.40	-13	-15.40
3819.6	-35.10	43	2.5	V	6.4	-28.70	-13	-15.70
5729.4	-44.90	43	2.4	H	9.1	-35.80	-13	-22.80
5729.4	-45.30	208	2.4	V	9.5	-35.80	-13	-22.80

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band 2								
Test frequency range: 30MHz-20GHz								
Low channel								
3704.8	-46.80	92	2.2	H	5.9	-40.90	-13	-27.90
3704.8	-46.10	98	2.2	V	6.4	-39.70	-13	-26.70
5557.2	-51.30	195	2.4	H	9.1	-42.20	-13	-29.20
5557.2	-50.90	156	1.9	V	9.5	-41.40	-13	-28.40
Middle channel								
3760.0	-47.10	134	1.1	H	6.2	-40.90	-13	-27.90
3760.0	-46.70	37	1.7	V	6.7	-40.00	-13	-27.00
5640.0	-51.10	120	1.3	H	9.1	-42.00	-13	-29.00
5640.0	-50.40	84	1.1	V	9.3	-41.10	-13	-28.10
High channel								
3815.2	-46.80	205	1.5	H	6.2	-40.60	-13	-27.60
3815.2	-45.90	324	1.5	V	6.4	-39.50	-13	-26.50
5722.8	-50.90	302	1	H	9.1	-41.80	-13	-28.80
5722.8	-50.10	258	1.1	V	9.5	-40.60	-13	-27.60

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 5								
Test frequency range: 30MHz-10GHz								
Low channel								
1652.8	-47.30	244	1.8	H	0.4	-46.90	-13	-33.90
1652.8	-45.30	209	2.3	V	0.2	-45.10	-13	-32.10
2479.2	-46.10	156	1.7	H	3.6	-42.50	-13	-29.50
2479.2	-44.80	183	1	V	4.1	-40.70	-13	-27.70
3305.6	-47.30	185	2.1	H	4.1	-43.20	-13	-30.20
3305.6	-47.00	235	1.9	V	4.3	-42.70	-13	-29.70
Middle channel								
1672.8	-47.00	51	1.2	H	0.5	-46.50	-13	-33.50
1672.8	-45.10	318	1.6	V	0.5	-44.60	-13	-31.60
2509.2	-45.80	65	1.7	H	3.6	-42.20	-13	-29.20
2509.2	-44.30	95	2	V	3.9	-40.40	-13	-27.40
3345.6	-47.10	295	1.5	H	4.1	-43.00	-13	-30.00
3345.6	-46.50	333	1.2	V	4.1	-42.40	-13	-29.40
High channel								
1693.2	-46.40	296	2	H	0.5	-45.90	-13	-32.90
1693.2	-44.80	336	2.3	V	0.9	-43.90	-13	-30.90
2539.8	-44.60	323	2.2	H	3.5	-41.10	-13	-28.10
2539.8	-43.40	217	1.2	V	3.8	-39.60	-13	-26.60
3386.4	-47.20	183	2.4	H	4.4	-42.80	-13	-29.80
3386.4	-46.90	318	2.1	V	4.9	-42.00	-13	-29.00

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	-48.40	101	1.6	H	5.9	-42.50	-13	-29.50
3701.4	-48.80	30	1.2	V	6.4	-42.40	-13	-29.40
5552.1	-49.60	115	2.4	H	9.1	-40.50	-13	-27.50
5552.1	-49.30	32	1	V	9.5	-39.80	-13	-26.80
QPSK 1.4MHz Bandwidth, Middle channel								
3760.0	-48.70	216	2.1	H	6.2	-42.50	-13	-29.50
3760.0	-49.30	71	1.7	V	6.7	-42.60	-13	-29.60
5640.0	-49.30	332	2.1	H	9.1	-40.20	-13	-27.20
5640.0	-48.80	282	1.9	V	9.3	-39.50	-13	-26.50
QPSK 1.4MHz Bandwidth, High channel								
3818.6	-47.80	19	1.3	H	6.1	-41.70	-13	-28.70
3818.6	-48.10	346	2.4	V	6.4	-41.70	-13	-28.70
5727.9	-48.80	99	1.4	H	9.1	-39.70	-13	-26.70
5727.9	-48.10	101	1.6	V	9.5	-38.60	-13	-25.60

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1649.4	-49.60	250	1.2	H	0.4	-49.20	-13	-36.20
1649.4	-49.50	64	1.5	V	0.1	-49.40	-13	-36.40
2474.1	-50.10	179	1.2	H	3.6	-46.50	-13	-33.50
2474.1	-49.50	94	2	V	4.2	-45.30	-13	-32.30
3298.8	-46.70	177	2.2	H	4.1	-42.60	-13	-29.60
3298.8	-47.40	223	1.9	V	4.3	-43.10	-13	-30.10
QPSK 1.4MHz Bandwidth, Middle channel								
1673.0	-47.40	220	1.6	H	0.5	-46.90	-13	-33.90
1673.0	-47.40	355	1.3	V	0.5	-46.90	-13	-33.90
2509.5	-49.80	316	1.1	H	3.6	-46.20	-13	-33.20
2509.5	-48.90	114	2.4	V	3.9	-45.00	-13	-32.00
3346.0	-46.50	33	2.4	H	4.1	-42.40	-13	-29.40
3346.0	-47.10	94	1.8	V	4.1	-43.00	-13	-30.00
QPSK 1.4MHz Bandwidth, High channel								
1696.6	-46.40	185	2.3	H	0.5	-45.90	-13	-32.90
1696.6	-46.80	18	2.2	V	0.9	-45.90	-13	-32.90
2544.9	-48.60	258	2.2	H	3.5	-45.10	-13	-32.10
2544.9	-47.80	32	2	V	3.8	-44.00	-13	-31.00
3393.2	-45.90	129	1.1	H	4.5	-41.40	-13	-28.40
3393.2	-46.80	183	2.1	V	5.1	-41.70	-13	-28.70

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	-56.10	120	2.1	H	1.6	-54.50	-13	-41.50
1399.4	-56.20	240	1.9	V	1.8	-54.40	-13	-41.40
2099.1	-39.90	140	1.7	H	3.8	-36.10	-13	-23.10
2099.1	-40.00	212	1.2	V	3.8	-36.20	-13	-23.20
2798.8	-48.00	344	1.4	H	3.8	-44.20	-13	-31.20
2798.8	-47.80	341	2.5	V	4.5	-43.30	-13	-30.30
QPSK 1.4MHz Bandwidth, Middle channel								
1415.0	-56.00	281	2.3	H	1.7	-54.30	-13	-41.30
1415.0	-56.00	85	2	V	1.8	-54.20	-13	-41.20
2122.5	-39.50	155	1.6	H	4	-35.50	-13	-22.50
2122.5	-39.80	314	1.6	V	4	-35.80	-13	-22.80
2830.0	-48.10	213	2.5	H	4.2	-43.90	-13	-30.90
2830.0	-47.70	208	2.2	V	4.7	-43.00	-13	-30.00
QPSK 1.4MHz Bandwidth, High channel								
1430.6	-55.30	275	2.4	H	1.7	-53.60	-13	-40.60
1430.6	-55.20	233	1.9	V	1.8	-53.40	-13	-40.40
2145.9	-39.10	274	1.6	H	4.2	-34.90	-13	-21.90
2145.9	-39.30	259	1.6	V	4.2	-35.10	-13	-22.10
2861.2	-48.00	258	1.6	H	4.6	-43.40	-13	-30.40
2861.2	-47.70	290	1.3	V	4.8	-42.90	-13	-29.90

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 Band13								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1559.0	-50.90	195	1.7	H	0.1	-50.80	-40	-10.80
1559.0	-52.10	127	2.4	V	1	-51.10	-40	-11.10
2338.5	-52.40	5	1.1	H	4.1	-48.30	-13	-35.30
2338.5	-52.00	67	1.2	V	4.3	-47.70	-13	-34.70
3118.0	-49.60	293	2.3	H	5.1	-44.50	-13	-31.50
3118.0	-49.20	164	1	V	5.3	-43.90	-13	-30.90
QPSK 1.4MHz Bandwidth, Middle channel								
1564.0	-50.80	148	1.1	H	0.2	-50.60	-40	-10.60
1564.0	-51.90	356	2	V	1	-50.90	-40	-10.90
2346.0	-52.20	297	2.3	H	4.2	-48.00	-13	-35.00
2346.0	-51.90	177	2.4	V	4.3	-47.60	-13	-34.60
3128.0	-49.50	336	2	H	5.2	-44.30	-13	-31.30
3128.0	-49.20	92	1.2	V	5.4	-43.80	-13	-30.80
QPSK 1.4MHz Bandwidth, High channel								
1569.0	-50.10	170	2.2	H	0.2	-49.90	-40	-9.90
1569.0	-51.10	136	2.1	V	0.9	-50.20	-40	-10.20
2353.5	-51.70	194	1.6	H	4.2	-47.50	-13	-34.50
2353.5	-50.30	48	2.2	V	4.3	-46.00	-13	-33.00
3138.0	-49.00	325	1.9	H	5.3	-43.70	-13	-30.70
3138.0	-48.60	278	2.3	V	5.5	-43.10	-13	-30.10

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-26.5GHz								
QPSK 5MHz Bandwidth, Low channel								
5075.0	-50.10	83	1.6	H	9	-41.10	-25	-16.10
5075.0	-49.80	165	1.6	V	9.3	-40.50	-25	-15.50
7612.5	-58.90	306	2.1	H	15.7	-43.20	-25	-18.20
7612.5	-58.20	90	1.3	V	15.7	-42.50	-25	-17.50
QPSK 5MHz Bandwidth, Middle channel								
5190.0	-49.40	216	1.8	H	8.5	-40.90	-25	-15.90
5190.0	-48.80	129	1.6	V	9	-39.80	-25	-14.80
7785.0	-57.70	96	2.1	H	15.5	-42.20	-25	-17.20
7785.0	-57.40	46	1.6	V	15.6	-41.80	-25	-16.80
QPSK 5MHz Bandwidth, High channel								
5305.0	-48.50	42	2.5	H	8.6	-39.90	-25	-14.90
5305.0	-47.20	179	1.4	V	8.6	-38.60	-25	-13.60
7957.5	-59.20	308	2.3	H	16.7	-42.50	-25	-17.50
7957.5	-58.80	221	2.1	V	16.8	-42.00	-25	-17.00

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.

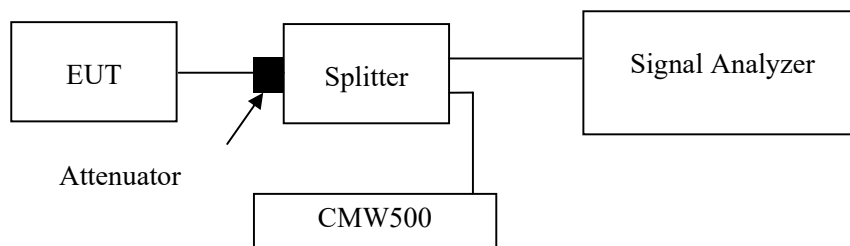
According to FCC §27.53 (m), For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel 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:	26~28.8 °C
Relative Humidity:	46.8~56 %
ATM Pressure:	101.0 kPa

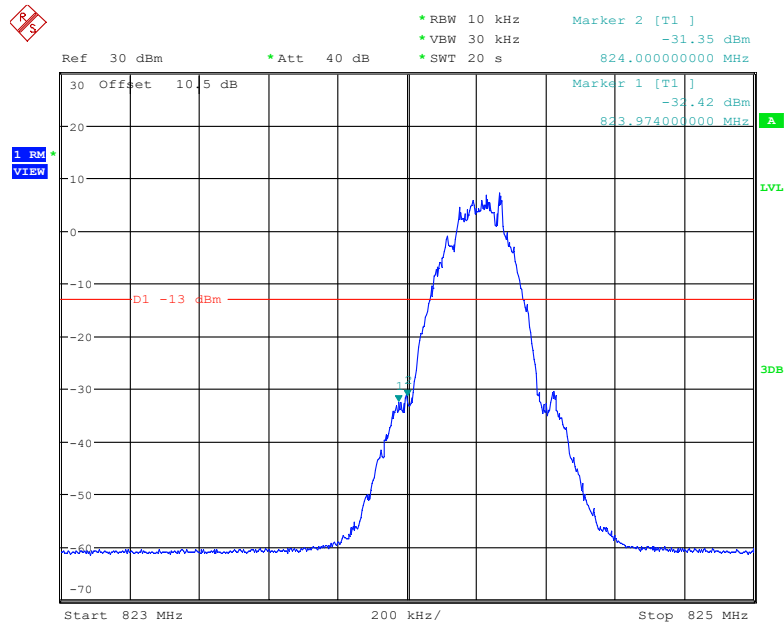
The testing was performed by Jacob Huang from 2023-05-19 to 2023-06-03.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

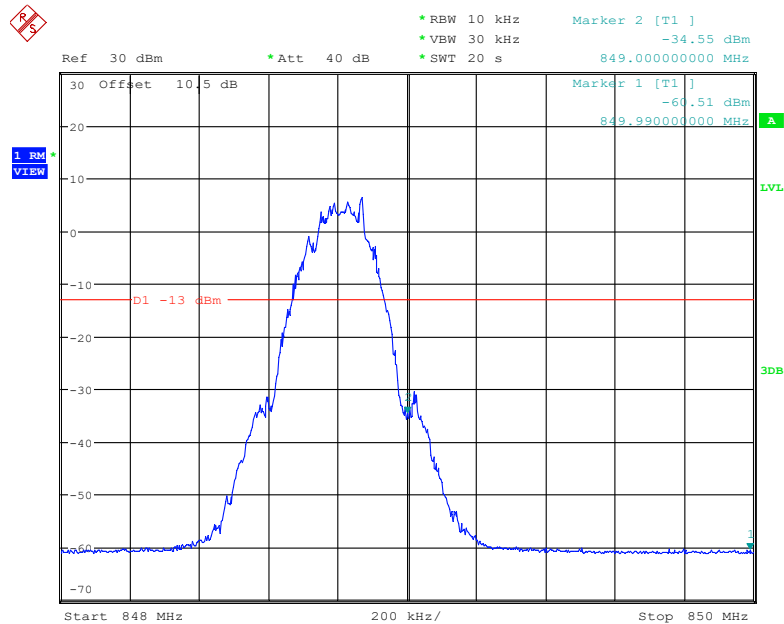
Please refer to the following plots.

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



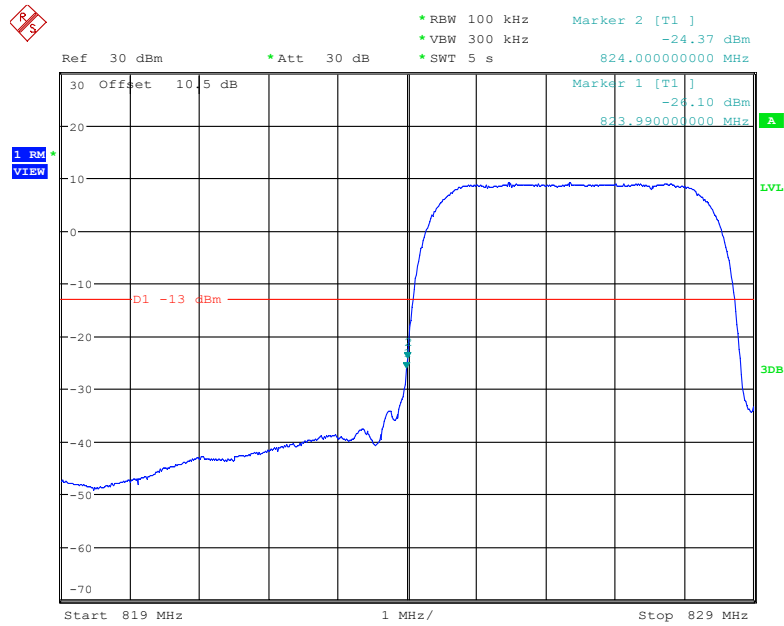
Date: 26.MAY.2023 19:58:15

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



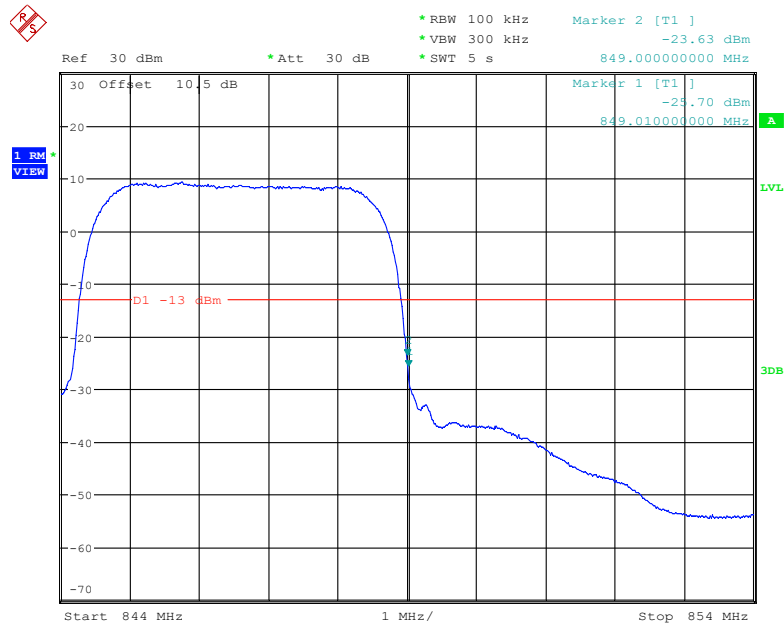
Date: 26.MAY.2023 20:04:12

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



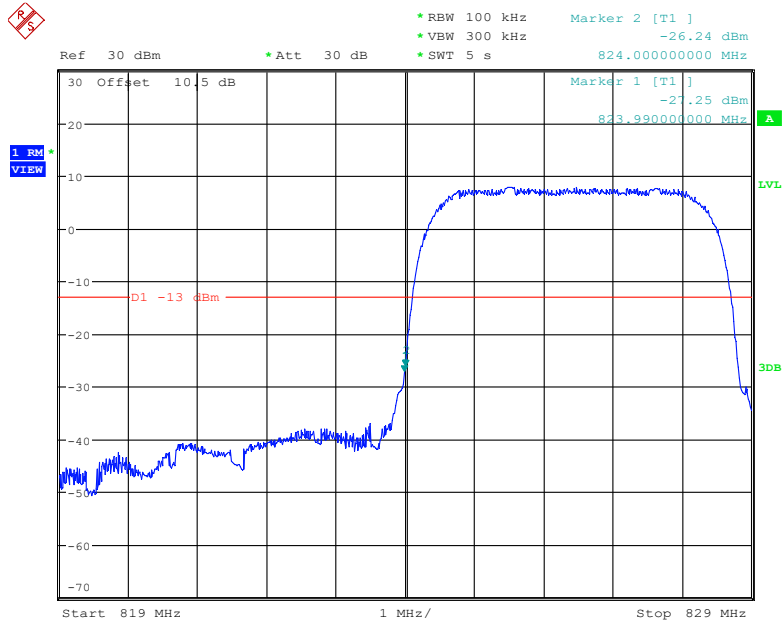
Date: 3.JUN.2023 21:56:40

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



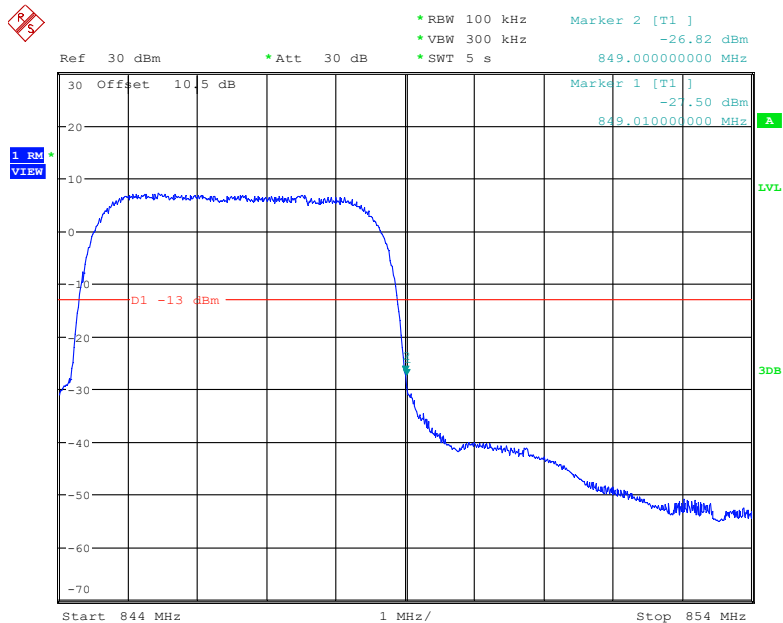
Date: 3.JUN.2023 22:09:22

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



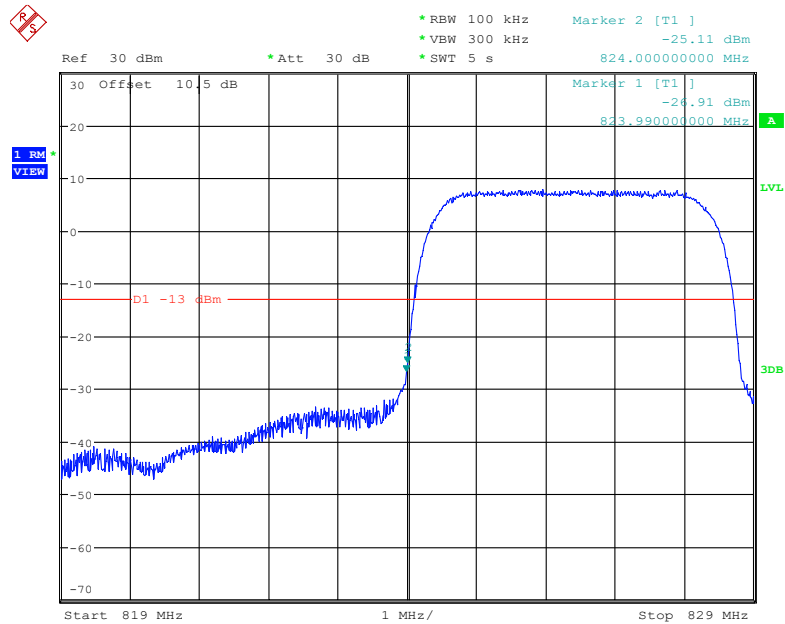
Date: 3.JUN.2023 22:19:41

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



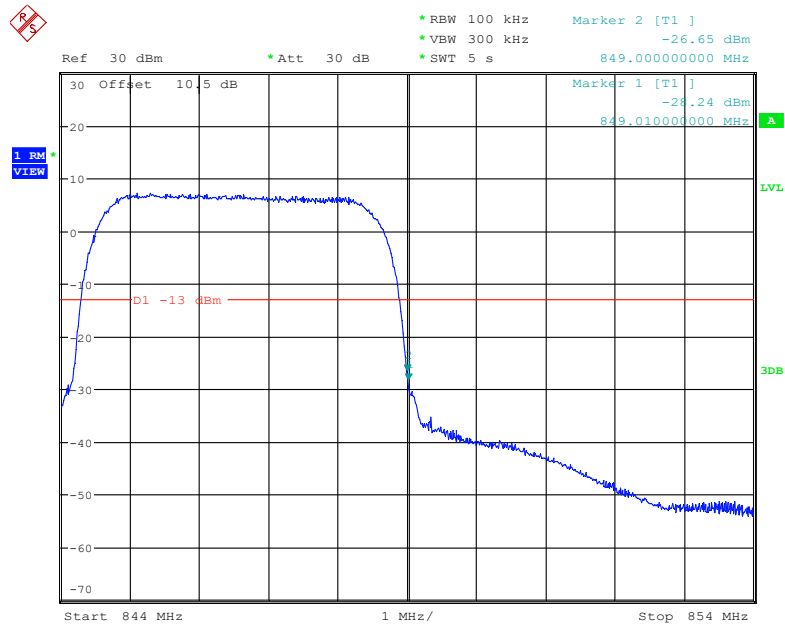
Date: 3.JUN.2023 22:36:39

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



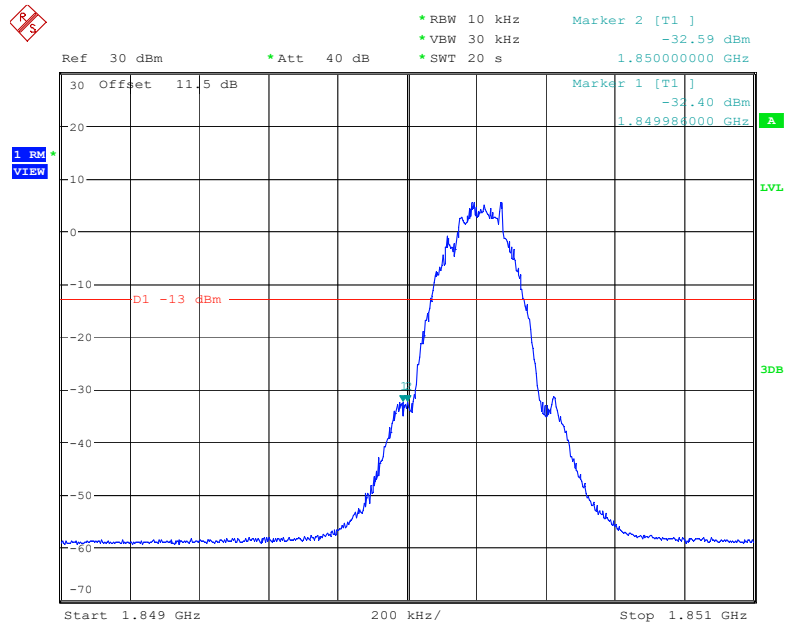
Date: 3.JUN.2023 22:42:47

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



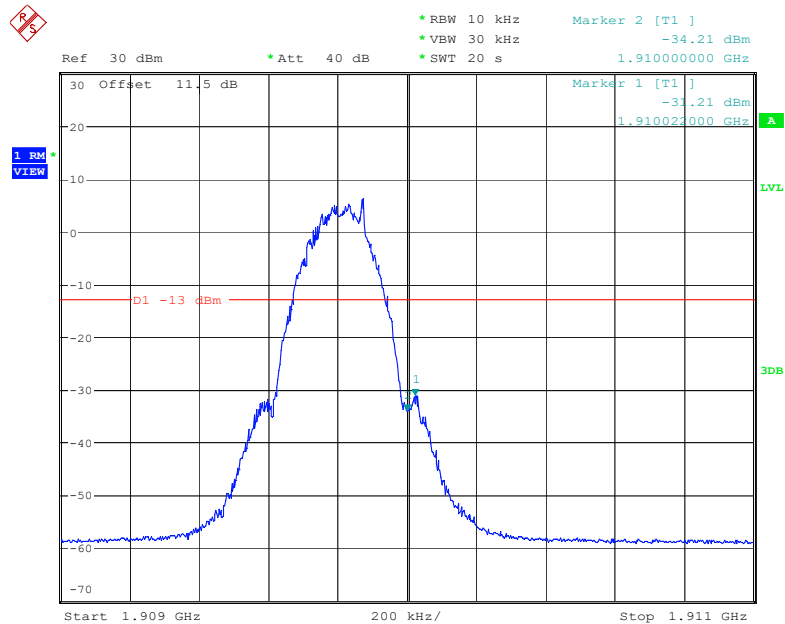
Date: 3.JUN.2023 22:49:58

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



Date: 29.MAY.2023 19:52:06

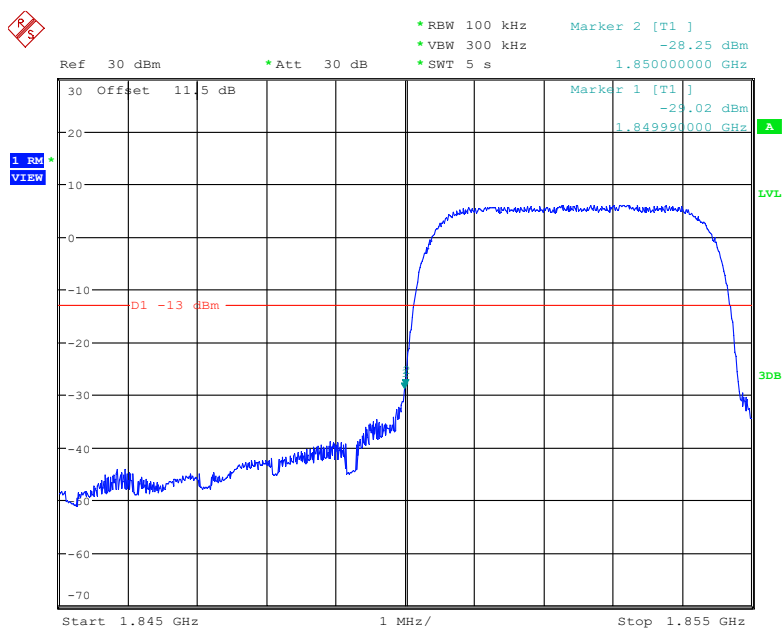
PCS Band, Right Band Edge for GSM (GMSK) Mode



Date: 29.MAY.2023 19:59:46

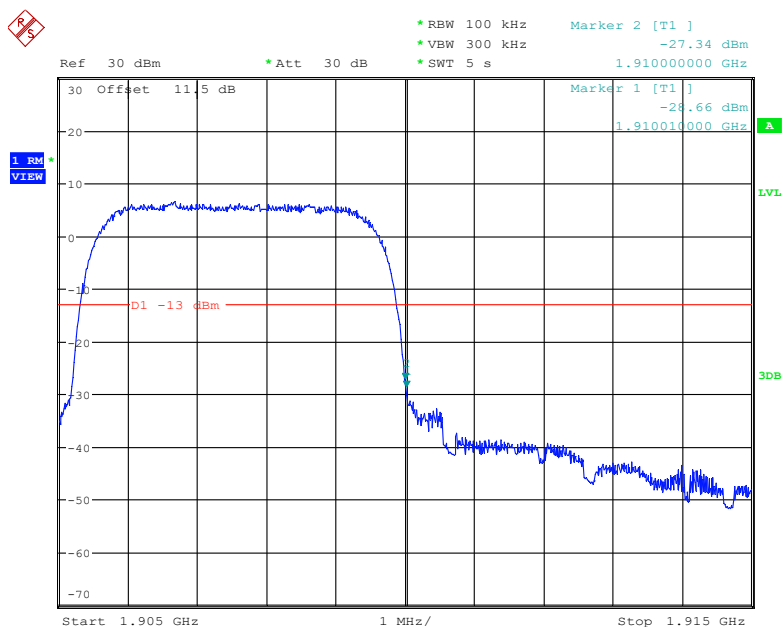


PCS Band, Left Band Edge for HSDPA(16QAM) Mode

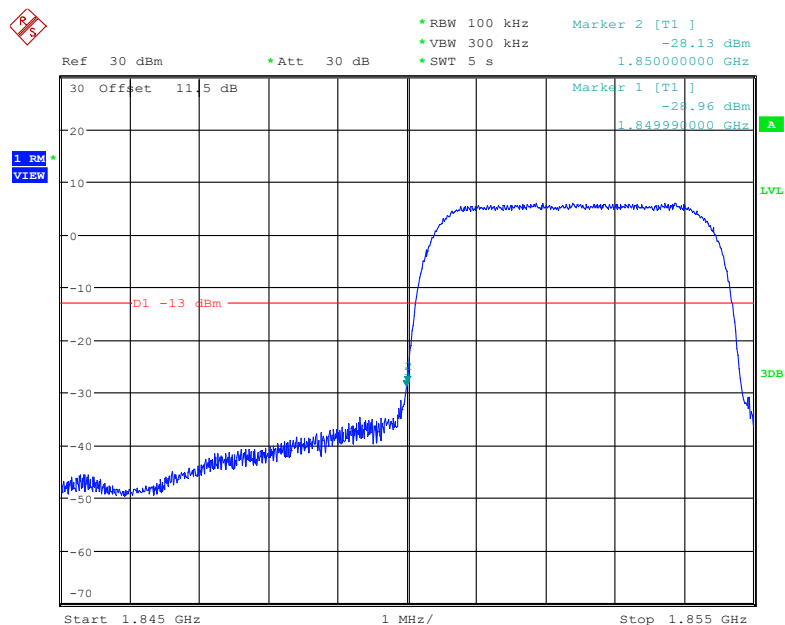


Date: 3.JUN.2023 21:06:15

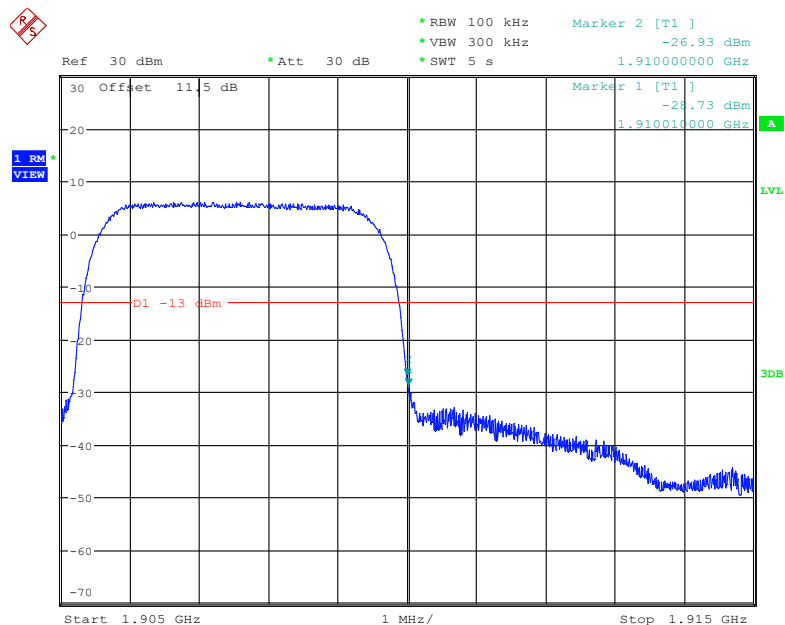
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



Date: 3.JUN.2023 21:19:24

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

Date: 3.JUN.2023 20:25:47

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

Date: 3.JUN.2023 20:35:13

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.

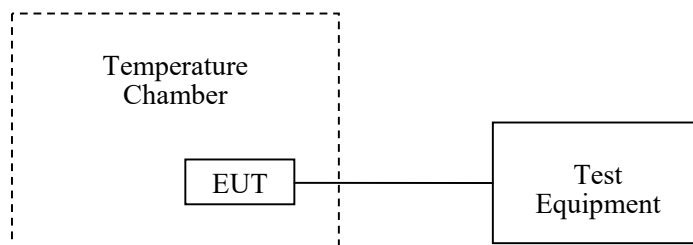
Test Procedure

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:	26~28.8 °C
Relative Humidity:	46.8~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-05-29 to 2023-06-03.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)**GSM 850 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.	12.11	0.0145	2.5
-20		10.58	0.0126	2.5
-10		9.62	0.0115	2.5
0		10.42	0.0124	2.5
10		11.25	0.0134	2.5
20		8.00	0.0096	2.5
30		15.13	0.0181	2.5
40		10.47	0.0125	2.5
50		17.52	0.0209	2.5
20	L.V.	18.28	0.0218	2.5
	H.V.	18.80	0.0225	2.5

WCDMA Mode

Middle Channel, $f_0=836.4$ MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-0.63	-0.0008	2.5
-20		-1.36	-0.0016	2.5
-10		-5.86	-0.0070	2.5
0		-5.86	-0.0070	2.5
10		-6.23	-0.0074	2.5
20		-7.50	-0.0090	2.5
30		-3.08	-0.0037	2.5
40		-2.24	-0.0027	2.5
50		-5.90	-0.0071	2.5
20	L.V.	-5.34	-0.0064	2.5
	H.V.	-5.10	-0.0061	2.5

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

Low Channel=1850.2MHz; High Channel=1909.8MHz					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.0127	1909.9752	1850	1910
-20		1850.0172	1909.9735	1850	1910
-10		1850.0128	1909.9767	1850	1910
0		1850.0163	1909.9720	1850	1910
10		1850.0154	1909.9765	1850	1910
20		1850.0128	1909.9765	1850	1910
30		1850.0132	1909.9745	1850	1910
40		1850.0127	1909.9771	1850	1910
50		1850.0168	1909.9730	1850	1910
20	L.V.	1850.0153	1909.9733	1850	1910
	H.V.	1850.0161	1909.9697	1850	1910

WCDMA Mode

Low Channel=1852.4MHz; High Channel=1907.6MHz					
Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	N.V.	1850.0162	1909.9717	1850	1910
-20		1850.0151	1909.9704	1850	1910
-10		1850.0108	1909.9722	1850	1910
0		1850.0167	1909.9726	1850	1910
10		1850.0122	1909.9725	1850	1910
20		1850.0103	1909.9760	1850	1910
30		1850.0122	1909.9709	1850	1910
40		1850.0095	1909.9720	1850	1910
50		1850.0118	1909.9746	1850	1910
20	L.V.	1850.0142	1909.9708	1850	1910
	H.V.	1850.0097	1909.9749	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.	1850.1353	1909.9857	1850	1910
-20		1850.1375	1909.9868	1850	1910
-10		1850.1391	1909.9905	1850	1910
0		1850.1317	1909.9916	1850	1910
10		1850.1342	1909.9867	1850	1910
20		1850.1332	1909.9915	1850	1910
30		1850.1338	1909.9856	1850	1910
40		1850.1330	1909.9912	1850	1910
50		1850.1318	1909.9881	1850	1910
20	L.V.	1850.1348	1909.9901	1850	1910
	H.V.	1850.1362	1909.9901	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.	9.42	0.0113	2.5
-20		8.13	0.0097	2.5
-10		6.35	0.0076	2.5
0		7.31	0.0087	2.5
10		4.23	0.0051	2.5
20		4.00	0.0048	2.5
30		7.48	0.0089	2.5
40		5.91	0.0071	2.5
50		13.14	0.0157	2.5
20	L.V.	13.90	0.0166	2.5
	H.V.	14.24	0.0170	2.5

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.	699.1317	715.9842	699	716
-20		699.1329	715.9822	699	716
-10		699.1380	715.9808	699	716
0		699.1346	715.9858	699	716
10		699.1342	715.9833	699	716
20		699.1345	715.9844	699	716
30		699.1372	715.9864	699	716
40		699.1335	715.9879	699	716
50		699.1351	715.9824	699	716
20	L.V.	699.1364	715.9824	699	716
	H.V.	699.1346	715.9872	699	716

Band 13:

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.	777.1294	786.9716	777	787
-20		777.1319	786.9769	777	787
-10		777.1277	786.9751	777	787
0		777.1336	786.9738	777	787
10		777.1292	786.9739	777	787
20		777.1286	786.9717	777	787
30		777.1305	786.9783	777	787
40		777.1325	786.9747	777	787
50		777.1328	786.9735	777	787
20	L.V.	777.1289	786.9763	777	787
	H.V.	777.1262	786.9760	777	787

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.	2535.1066	2654.9837	2535	2655
-20		2535.1104	2654.9841	2535	2655
-10		2535.1076	2654.9852	2535	2655
0		2535.1110	2654.9850	2535	2655
10		2535.1092	2654.9839	2535	2655
20		2535.1104	2654.9847	2535	2655
30		2535.1077	2654.9880	2535	2655
40		2535.1134	2654.9841	2535	2655
50		2535.1115	2654.9872	2535	2655
20	L.V.	2535.1096	2654.9819	2535	2655
	H.V.	2535.1069	2654.9875	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.	1850.0992	1909.9060	1850	1910
-20		1850.1011	1909.9013	1850	1910
-10		1850.0975	1909.9019	1850	1910
0		1850.0996	1909.8995	1850	1910
10		1850.0989	1909.9013	1850	1910
20		1850.0959	1909.8999	1850	1910
30		1850.0960	1909.9031	1850	1910
40		1850.0987	1909.9032	1850	1910
50		1850.0986	1909.9058	1850	1910
20	L.V.	1850.0969	1909.9016	1850	1910
	H.V.	1850.0983	1909.9012	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.	12.68	0.0067	2.5
-20		11.50	0.0061	2.5
-10		4.19	0.0022	2.5
0		4.07	0.0022	2.5
10		3.87	0.0021	2.5
20		-4.50	-0.0024	2.5
30		-4.16	-0.0022	2.5
40		-0.26	-0.0001	2.5
50		4.73	0.0025	2.5
20	L.V.	5.01	0.0027	2.5
	H.V.	5.29	0.0028	2.5

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.	699.0683	715.8989	699	716
-20		699.0721	715.9023	699	716
-10		699.0691	715.9008	699	716
0		699.0716	715.9018	699	716
10		699.0689	715.8982	699	716
20		699.0699	715.8957	699	716
30		699.0661	715.8972	699	716
40		699.0677	715.9031	699	716
50		699.0680	715.8989	699	716
20	L.V.	699.0682	715.8955	699	716
	H.V.	699.0699	715.8972	699	716

Band 13:

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.	777.1104	786.9863	777	787
-20		777.1115	786.9894	777	787
-10		777.1118	786.9887	777	787
0		777.1126	786.9871	777	787
10		777.1123	786.9882	777	787
20		777.1116	786.9853	777	787
30		777.1123	786.9865	777	787
40		777.1146	786.9879	777	787
50		777.1109	786.9919	777	787
20	L.V.	777.1123	786.9865	777	787
	H.V.	777.1136	786.9858	777	787

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.	2535.1064	2654.9883	2535	2655
-20		2535.1124	2654.9853	2535	2655
-10		2535.1137	2654.9814	2535	2655
0		2535.1081	2654.9889	2535	2655
10		2535.1227	2654.9866	2535	2655
20		2535.1139	2654.9868	2535	2655
30		2535.1090	2654.9820	2535	2655
40		2535.1114	2654.9809	2535	2655
50		2535.1113	2654.9873	2535	2655
20	L.V.	2535.1105	2654.9821	2535	2655
	H.V.	2535.1087	2654.9854	2535	2655

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