TESTREPORT

Applicant Name :	Bolt Modus Corp
Address :	Oficina N.33 Edificio Ofidepositos Central, Calidonia - Distrito Federal, Panama
Report Number:	SZNS220524-22419E-RF-00C
FCC ID:	2APW4ART3L

Test Standard (s)

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

Sample Description

Product Type:	4G Smart Phone
Model No.:	ART 3 LITE
Multiple Model(s) No.:	N/A
Trade Mark:	yezz
Date Received:	2022/05/24
Report Date:	2022/07/18

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger Ling
EMC Engineer

Approved By:

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★ ".
Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.
This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

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 4: 1710-1755MHz(TX); 2110-2155MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 17: 704-716MHz(TX); 734-746MHz(RX)
Modulation Technique	2G: GMSK, 8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA Band 5: -0.16 dBi PCS1900/WCDMA Band 2/ LTE Band 2: 0.15 dBi WCDMA Band 4/ LTE Band 4: 0.16 dBi LTE Band 7: 0.18 dBi LTE Band 12/ LTE Band 17: -0.16 dBi (provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5.0V from adapter
Sample serial number	SZNS220524-22419E-RF-S1 for Conducted and Radiated Emissions SZNS220524-22419E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: CART3L Input: AC 100-240V, 50/60Hz Output: DC 5.0V, 2.0A
Extreme condition*	L.V.: Low Voltage 3.4V_{DC} N.V.: Normal Voltage 3.85V_{DC} H.V.: High Voltage 4.4V_{DC} (provided by the applicant)

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

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 output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
RF Frequency		$\pm 0.082*10^{-7}$
Emissions, Radiated	30MHz - 1GHz	±4.28dB
	1GHz - 18GHz	±4.98dB
	18GHz - 26.5GHz	±5.06dB
Temperature		±1℃
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 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. 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 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Test was performed as below table:

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.4	848.8
DCS1900	0.25	1850.2	1880	1909.8
WCDMA B2	4.2	1852.4	1880	1907.6
WCDMA B5	4.2	826.4	836.4	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 B4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
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	707.5	711
LTE B17	5	706.5	710	713.5
	10	709	710	711

Equipment Modifications

No modification was made to the EUT.

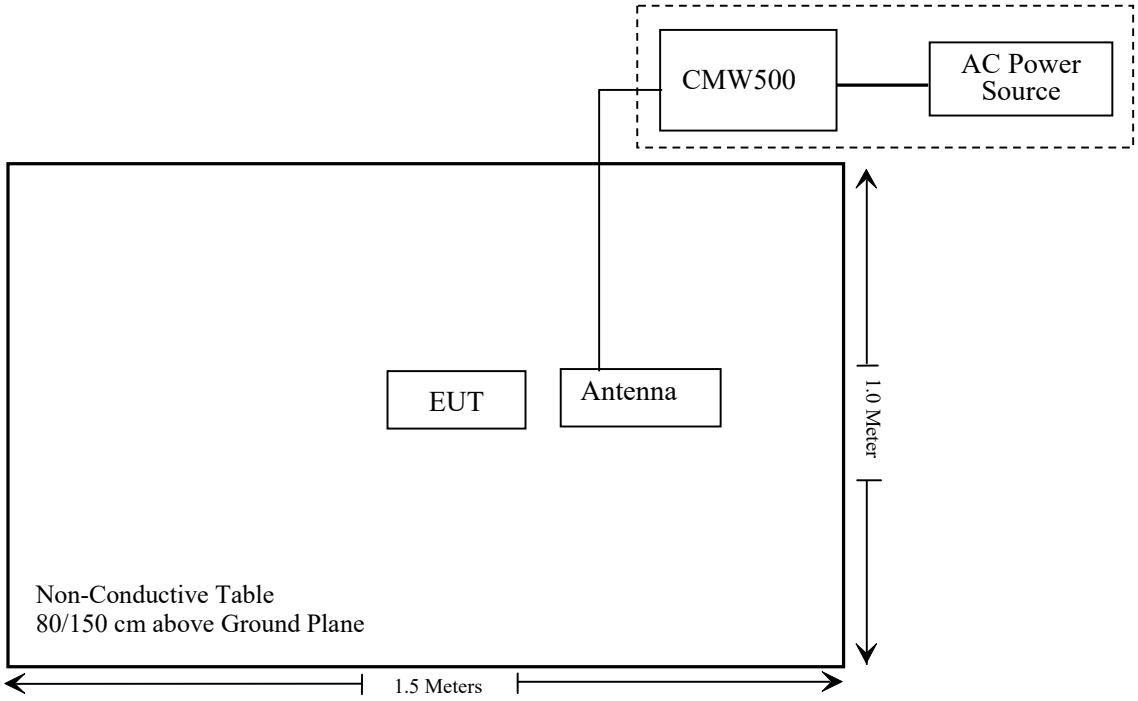
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication tester	CMW500	146520

Support Cable Description

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

Block Diagram of Test Setup



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(c)(d) (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(g)(h)(m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

Note: * Please refer to SAR report number: SZNS220524-22419E-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
PASTERNACK	Horn Antenn	PE9852/2F-20	1120 (ATC-BA-024-1)	2020/01/05	2023/01/04
PASTERNACK	Horn Antenn	PE9852/2F-20	1120 (ATC-BA-025-1)	2020/01/05	2023/01/04
Wainwright	High Pass Filter	WHKX3.6/18G-10SS	5	2021/12/14	2022/12/13
CD	High Pass Filter	HPM-1.2/18G-60	110	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N200	2021/12/14	2022/12/13
Agilent	Signal Generator	N5183A	MY51040755	2021/12/13	2022/12/12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2021/12/13	2022/12/12
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2021/07/06	2022/07/05
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2021/12/13	2022/12/12
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2021/12/14	2022/12/13
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2021/10/14	2022/10/13
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
Fluke	Multi Meter	45	7664009	2021/12/14	2022/12/13
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Unknown	RF Coaxial Cable	No.33	RF-03	Each time	
Unknown	RF Coaxial Cable	No.34	RF-04	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: SZNS220524-22419E-SA.

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)(d)(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), 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.

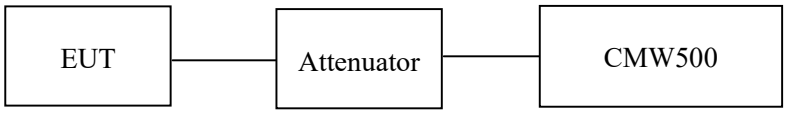
According to §27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

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

Test Procedure

Conducted method:

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



Test Data

Environmental Conditions

Temperature:	28.1~28.3 ℃
Relative Humidity:	56~57 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-17 to 2022-06-19.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	33.38	30.77	38.45
	189	836.4	33.45	30.84	38.45
	251	848.8	33.57	30.96	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	33.09	31.92	29.62	28.37	30.48	29.31	27.01	25.76	38.45
	189	836.4	33.26	32.09	29.80	28.47	30.65	29.48	27.19	25.86	38.45
	251	848.8	33.21	32.07	29.84	28.58	30.60	29.46	27.23	25.97	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	
EDGE	128	824.2	26.41	24.74	22.46	21.12	23.80	22.13	19.85	18.51	38.45
	189	836.4	26.64	24.99	22.68	21.29	24.03	22.38	20.07	18.68	38.45
	251	848.8	26.76	25.19	22.77	21.17	24.15	22.58	20.16	18.56	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		22.83	22.54	22.69	20.22	19.93	20.08
	HSDPA	1	21.78	21.69	21.70	19.17	19.08	19.09
		2	21.63	21.79	22.04	19.02	19.18	19.43
		3	21.87	21.74	21.83	19.26	19.13	19.22
		4	21.68	21.83	21.73	19.07	19.22	19.12
	HSUPA	1	21.49	21.15	21.40	18.88	18.54	18.79
		2	21.59	21.12	21.13	18.98	18.51	18.52
		3	21.39	20.83	20.95	18.78	18.22	18.34
		4	21.14	21.13	21.04	18.53	18.52	18.43
		5	21.23	20.84	21.11	18.62	18.23	18.50
	HSPA+	1	21.33	20.96	21.03	18.72	18.35	18.42

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)
For GSM850 / WCDMA Band5: Antenna Gain = -0.16dBi =-2.31dBd (0dBd=2.15dBi)
For 700-960MHz, Cable Loss=0.3dB* (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	29.10	28.75	33
	661	1880.0	29.32	28.97	33
	810	1909.8	29.21	28.86	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	29.06	28.26	26.41	25.22	28.71	27.91	26.06	24.87	33
	661	1880.0	29.12	28.18	26.29	25.16	28.77	27.83	25.94	24.81	33
	810	1909.8	29.08	28.05	26.16	25.12	28.73	27.70	25.81	24.77	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	
EDGE	512	1850.2	25.56	24.01	21.48	20.09	25.21	23.66	21.13	19.74	33
	661	1880.0	25.68	23.86	21.37	19.92	25.33	23.51	21.02	19.57	33
	810	1909.8	25.61	23.76	21.10	19.79	25.26	23.41	20.75	19.44	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.54	22.70	22.86	22.19	22.35	22.51
	HSDPA	1	21.62	21.82	21.89	21.27	21.47	21.54
		2	21.26	21.79	21.53	20.91	21.44	21.18
		3	21.45	21.72	21.64	21.10	21.37	21.29
		4	21.28	21.57	21.51	20.93	21.22	21.16
	HSUPA	1	21.30	21.14	21.64	20.95	20.79	21.29
		2	21.39	21.49	21.60	21.04	21.14	21.25
		3	21.44	21.43	21.38	21.09	21.08	21.03
		4	21.15	21.18	21.27	20.80	20.83	20.92
		5	21.39	21.22	21.27	21.04	20.87	20.92
	HSPA+	1	21.20	21.52	21.65	20.85	21.17	21.30

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)
For PCS1900 / WCDMA Band2: Antenna Gain = 0.15dBi
For 1700-2000MHz, Cable Loss=0.5dB*(provided by the applicant)
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	22.67	22.79	22.91	22.32	22.44	22.56
		RB1#3	22.73	22.67	22.97	22.38	22.32	22.62
		RB1#5	22.53	22.80	22.94	22.18	22.45	22.59
		RB3#0	22.52	22.75	22.99	22.17	22.40	22.64
		RB3#3	22.73	22.72	22.99	22.38	22.37	22.64
		RB6#0	21.80	21.94	22.19	21.45	21.59	21.84
	16QAM	RB1#0	21.58	21.67	22.09	21.23	21.32	21.74
		RB1#3	21.63	21.57	22.03	21.28	21.22	21.68
		RB1#5	21.45	21.82	22.18	21.10	21.47	21.83
		RB3#0	21.81	21.85	21.96	21.46	21.50	21.61
		RB3#3	21.71	21.92	21.96	21.36	21.57	21.61
		RB6#0	20.77	20.84	21.34	20.42	20.49	20.99
3.0	QPSK	RB1#0	22.43	22.42	22.80	22.08	22.07	22.45
		RB1#8	22.44	22.54	22.90	22.09	22.19	22.55
		RB1#14	22.47	22.61	22.75	22.12	22.26	22.40
		RB6#0	21.63	21.74	21.80	21.28	21.39	21.45
		RB6#9	21.70	21.64	21.90	21.35	21.29	21.55
		RB15#0	21.68	21.86	21.98	21.33	21.51	21.63
	16QAM	RB1#0	21.99	21.73	21.89	21.64	21.38	21.54
		RB1#8	21.94	21.73	21.82	21.59	21.38	21.47
		RB1#14	21.95	21.76	21.72	21.60	21.41	21.37
		RB6#0	20.89	20.84	20.98	20.54	20.49	20.63
		RB6#9	20.75	20.97	21.09	20.40	20.62	20.74
		RB15#0	20.73	20.69	21.06	20.38	20.34	20.71

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	22.79	22.85	23.12	22.44	22.50	22.77
		RB1#13	22.92	22.95	23.08	22.57	22.60	22.73
		RB1#24	22.76	22.86	23.02	22.41	22.51	22.67
		RB15#0	21.87	21.88	22.11	21.52	21.53	21.76
		RB15#10	21.75	21.88	21.97	21.40	21.53	21.62
		RB25#0	22.00	22.00	22.22	21.65	21.65	21.87
	16QAM	RB1#0	21.67	22.24	21.95	21.32	21.89	21.60
		RB1#13	21.68	22.18	22.21	21.33	21.83	21.86
		RB1#24	21.56	22.06	21.99	21.21	21.71	21.64
		RB15#0	20.66	20.93	21.16	20.31	20.58	20.81
		RB15#10	20.82	20.86	21.12	20.47	20.51	20.77
		RB25#0	20.86	20.91	21.14	20.51	20.56	20.79
10.0	QPSK	RB1#0	22.78	22.97	23.07	22.43	22.62	22.72
		RB1#25	22.70	22.89	23.07	22.35	22.54	22.72
		RB1#49	22.74	22.91	23.07	22.39	22.56	22.72
		RB25#0	21.77	21.77	22.07	21.42	21.42	21.72
		RB25#25	21.92	21.90	21.95	21.57	21.55	21.60
		RB50#0	21.83	21.97	22.15	21.48	21.62	21.80
	16QAM	RB1#0	22.18	22.05	22.07	21.83	21.70	21.72
		RB1#25	22.33	21.95	22.13	21.98	21.60	21.78
		RB1#49	22.53	22.20	22.25	22.18	21.85	21.90
		RB25#0	20.75	20.80	21.29	20.40	20.45	20.94
		RB25#25	20.93	20.92	21.26	20.58	20.57	20.91
		RB50#0	20.94	20.94	21.18	20.59	20.59	20.83

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	22.71	22.90	22.94	22.36	22.55	22.59
		RB1#38	22.85	22.93	23.16	22.50	22.58	22.81
		RB1#74	22.88	22.99	23.08	22.53	22.64	22.73
		RB36#0	21.84	22.00	22.09	21.49	21.65	21.74
		RB36#39	21.88	21.88	22.04	21.53	21.53	21.69
		RB75#0	22.00	21.83	22.12	21.65	21.48	21.77
	16QAM	RB1#0	22.32	21.95	22.27	21.97	21.60	21.92
		RB1#38	22.41	22.00	22.25	22.06	21.65	21.90
		RB1#74	22.39	21.98	22.33	22.04	21.63	21.98
		RB36#0	20.84	20.89	21.16	20.49	20.54	20.81
		RB36#39	20.92	20.95	21.14	20.57	20.60	20.79
		RB75#0	21.01	21.04	21.16	20.66	20.69	20.81
20.0	QPSK	RB1#0	22.56	22.83	22.83	22.21	22.48	22.48
		RB1#50	22.84	23.11	23.26	22.49	22.76	22.91
		RB1#99	22.76	22.91	23.17	22.41	22.56	22.82
		RB50#0	21.71	21.94	22.06	21.36	21.59	21.71
		RB50#50	22.14	21.97	22.04	21.79	21.62	21.69
		RB100#0	21.89	21.86	22.00	21.54	21.51	21.65
	16QAM	RB1#0	22.03	21.98	22.35	21.68	21.63	22.00
		RB1#50	22.37	22.29	22.58	22.02	21.94	22.23
		RB1#99	22.10	22.09	22.61	21.75	21.74	22.26
		RB50#0	20.83	20.89	20.94	20.48	20.54	20.59
		RB50#50	21.02	21.13	20.85	20.67	20.78	20.50
		RB100#0	20.93	21.04	20.93	20.58	20.69	20.58

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)
For Band2: Antenna Gain = 0.15dBi
Cable Loss=0.5dB*(provided by the applicant)
Limit: EIRP≤33dBm

LTE Band 4

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	22.89	23.08	22.85	22.55	22.74	22.51
		RB1#3	22.85	22.82	22.77	22.51	22.48	22.43
		RB1#5	22.91	22.84	22.86	22.57	22.50	22.52
		RB3#0	22.96	23.03	22.79	22.62	22.69	22.45
		RB3#3	22.95	22.88	22.94	22.61	22.54	22.60
		RB6#0	21.95	22.12	21.96	21.61	21.78	21.62
	16QAM	RB1#0	21.79	22.11	21.76	21.45	21.77	21.42
		RB1#3	21.99	22.04	22.02	21.65	21.70	21.68
		RB1#5	21.98	22.13	21.80	21.64	21.79	21.46
		RB3#0	22.15	22.09	21.94	21.81	21.75	21.60
		RB3#3	22.17	22.03	22.15	21.83	21.69	21.81
		RB6#0	21.24	21.23	20.99	20.90	20.89	20.65
3.0	QPSK	RB1#0	22.77	22.77	22.67	22.43	22.43	22.33
		RB1#8	22.68	22.89	22.77	22.34	22.55	22.43
		RB1#14	22.64	22.91	22.86	22.30	22.57	22.52
		RB6#0	21.93	22.10	21.94	21.59	21.76	21.60
		RB6#9	22.08	21.85	21.93	21.74	21.51	21.59
		RB15#0	21.81	21.96	22.04	21.47	21.62	21.70
	16QAM	RB1#0	22.23	21.84	21.87	21.89	21.50	21.53
		RB1#8	22.40	21.76	21.76	22.06	21.42	21.42
		RB1#14	22.26	22.06	21.87	21.92	21.72	21.53
		RB6#0	21.25	21.01	20.85	20.91	20.67	20.51
		RB6#9	21.06	20.93	20.85	20.72	20.59	20.51
		RB15#0	21.00	20.93	21.05	20.66	20.59	20.71

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	23.08	22.96	22.95	22.74	22.62	22.61
		RB1#13	23.08	23.27	23.04	22.74	22.93	22.70
		RB1#24	22.94	23.11	23.04	22.60	22.77	22.70
		RB15#0	22.10	22.20	22.17	21.76	21.86	21.83
		RB15#10	22.12	21.92	22.11	21.78	21.58	21.77
		RB25#0	22.09	22.02	22.16	21.75	21.68	21.82
	16QAM	RB1#0	21.84	22.32	22.17	21.50	21.98	21.83
		RB1#13	22.24	22.48	22.16	21.90	22.14	21.82
		RB1#24	22.12	22.38	21.98	21.78	22.04	21.64
		RB15#0	21.21	21.23	21.17	20.87	20.89	20.83
		RB15#10	21.20	21.18	21.02	20.86	20.84	20.68
		RB25#0	21.26	21.25	21.08	20.92	20.91	20.74
10.0	QPSK	RB1#0	23.03	23.01	23.15	22.69	22.67	22.81
		RB1#25	23.14	23.19	23.07	22.80	22.85	22.73
		RB1#49	22.94	23.15	23.08	22.60	22.81	22.74
		RB25#0	21.99	22.10	22.11	21.65	21.76	21.77
		RB25#25	22.16	22.24	22.12	21.82	21.90	21.78
		RB50#0	22.15	22.01	22.10	21.81	21.67	21.76
	16QAM	RB1#0	22.76	22.37	22.18	22.42	22.03	21.84
		RB1#25	22.85	22.10	22.22	22.51	21.76	21.88
		RB1#49	22.81	22.30	22.04	22.47	21.96	21.70
		RB25#0	21.00	21.01	21.32	20.66	20.67	20.98
		RB25#25	21.22	21.17	21.26	20.88	20.83	20.92
		RB50#0	21.07	21.06	20.96	20.73	20.72	20.62

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	22.58	22.84	22.96	22.24	22.50	22.62
		RB1#38	22.68	22.92	23.21	22.34	22.58	22.87
		RB1#74	22.81	22.87	23.12	22.47	22.53	22.78
		RB36#0	21.77	22.13	22.04	21.43	21.79	21.70
		RB36#39	21.97	22.06	21.96	21.63	21.72	21.62
		RB75#0	21.88	22.07	22.19	21.54	21.73	21.85
	16QAM	RB1#0	22.23	21.85	22.22	21.89	21.51	21.88
		RB1#38	22.37	21.94	22.43	22.03	21.60	22.09
		RB1#74	22.43	22.05	22.45	22.09	21.71	22.11
		RB36#0	20.84	20.89	21.08	20.50	20.55	20.74
		RB36#39	20.96	20.96	21.11	20.62	20.62	20.77
		RB75#0	20.80	21.08	20.88	20.46	20.74	20.54
20.0	QPSK	RB1#0	22.64	22.77	22.96	22.30	22.43	22.62
		RB1#50	22.72	22.83	23.09	22.38	22.49	22.75
		RB1#99	22.91	22.85	23.18	22.57	22.51	22.84
		RB50#0	21.75	21.93	22.00	21.41	21.59	21.66
		RB50#50	21.85	22.01	21.88	21.51	21.67	21.54
		RB100#0	21.80	21.90	21.92	21.46	21.56	21.58
	16QAM	RB1#0	22.20	22.15	22.39	21.86	21.81	22.05
		RB1#50	22.20	22.27	22.48	21.86	21.93	22.14
		RB1#99	22.23	22.11	22.55	21.89	21.77	22.21
		RB50#0	20.69	20.92	21.13	20.35	20.58	20.79
		RB50#50	20.90	21.10	21.11	20.56	20.76	20.77
		RB100#0	20.95	21.17	21.07	20.61	20.83	20.73

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)
For Band4: Antenna Gain = 0.16dBi
Cable Loss=0.5dB*(provided by the applicant)
Limit: EIRP≤30dBm

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	23.27	22.83	22.95	22.95	22.51	22.63
		RB1#12	22.69	22.95	22.64	22.37	22.63	22.32
		RB1#24	22.45	22.40	22.48	22.13	22.08	22.16
		RB12#0	22.81	22.88	22.89	22.49	22.56	22.57
		RB12#6	22.84	23.00	22.74	22.52	22.68	22.42
		RB12#11	22.87	22.68	22.63	22.55	22.36	22.31
		RB25#0	21.69	21.54	21.47	21.37	21.22	21.15
	16QAM	RB1#0	21.88	21.63	21.45	21.56	21.31	21.13
		RB1#12	22.01	21.63	21.47	21.69	21.31	21.15
		RB1#24	21.21	21.38	21.30	20.89	21.06	20.98
		RB12#0	21.03	21.41	21.86	20.71	21.09	21.54
		RB12#6	21.19	21.59	21.33	20.87	21.27	21.01
		RB12#11	21.06	21.61	21.75	20.74	21.29	21.43
		RB25#0	20.77	20.60	20.72	20.45	20.28	20.40
10.0	QPSK	RB1#0	22.99	22.92	22.67	22.67	22.60	22.35
		RB1#24	22.43	22.52	22.48	22.11	22.20	22.16
		RB1#49	22.47	22.23	22.66	22.15	21.91	22.34
		RB25#0	23.03	23.03	22.71	22.71	22.71	22.39
		RB25#12	22.58	23.08	23.13	22.26	22.76	22.81
		RB25#24	22.66	22.71	22.84	22.34	22.39	22.52
		RB50#0	21.39	21.59	21.52	21.07	21.27	21.20
	16QAM	RB1#0	21.58	21.07	21.24	21.26	20.75	20.92
		RB1#24	21.64	21.38	21.63	21.32	21.06	21.31
		RB1#49	21.32	21.61	21.55	21.00	21.29	21.23
		RB25#0	23.27	22.83	22.95	22.95	22.51	22.63
		RB25#12	22.69	22.95	22.64	22.37	22.63	22.32
		RB25#24	22.45	22.40	22.48	22.13	22.08	22.16
		RB50#0	22.81	22.88	22.89	22.49	22.56	22.57

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	23.11	23.19	23.10	22.79	22.87	22.78
		RB1#37	22.89	22.45	22.35	22.57	22.13	22.03
		RB1#74	23.00	22.43	22.30	22.68	22.11	21.98
		RB36#0	22.95	22.67	23.08	22.63	22.35	22.76
		RB36#18	23.19	23.03	22.80	22.87	22.71	22.48
		RB36#37	22.38	22.39	22.47	22.06	22.07	22.15
		RB75#0	21.27	21.48	21.37	20.95	21.16	21.05
	16QAM	RB1#0	21.80	21.24	21.52	21.48	20.92	21.20
		RB1#37	21.86	21.60	21.79	21.54	21.28	21.47
		RB1#74	21.64	21.27	21.27	21.32	20.95	20.95
		RB36#0	20.88	21.63	21.13	20.56	21.31	20.81
		RB36#18	21.40	21.62	21.32	21.08	21.30	21.00
		RB36#37	21.03	21.53	21.62	20.71	21.21	21.30
		RB75#0	21.18	20.56	20.94	20.86	20.24	20.62
20.0	QPSK	RB1#0	23.03	23.08	23.09	22.71	22.76	22.77
		RB1#49	22.53	22.63	22.71	22.21	22.31	22.39
		RB1#99	22.46	22.56	22.46	22.14	22.24	22.14
		RB50#0	22.78	22.89	22.99	22.46	22.57	22.67
		RB50#24	22.71	22.97	22.95	22.39	22.65	22.63
		RB50#49	22.97	22.91	22.69	22.65	22.59	22.37
		RB100#0	21.47	21.61	21.56	21.15	21.29	21.24
	16QAM	RB1#0	21.79	21.31	21.62	21.47	20.99	21.30
		RB1#49	22.08	21.42	21.75	21.76	21.10	21.43
		RB1#99	21.45	21.10	21.63	21.13	20.78	21.31
		RB50#0	23.11	23.19	23.10	22.79	22.87	22.78
		RB50#24	22.89	22.45	22.35	22.57	22.13	22.03
		RB50#49	23.00	22.43	22.30	22.68	22.11	21.98
		RB100#0	22.95	22.67	23.08	22.63	22.35	22.76

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)
For Band7: Antenna Gain = 0.18dBi
Cable Loss=0.5dB*(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	23.56	23.48	23.61	20.95	20.87	21.00
		RB1#3	23.77	23.65	23.54	21.16	21.04	20.93
		RB1#5	23.60	23.54	23.54	20.99	20.93	20.93
		RB3#0	23.58	23.59	23.62	20.97	20.98	21.01
		RB3#3	23.61	23.60	23.54	21.00	20.99	20.93
		RB6#0	22.67	22.67	22.60	20.06	20.06	19.99
	16QAM	RB1#0	22.47	22.84	22.43	19.86	20.23	19.82
		RB1#3	22.57	22.74	22.70	19.96	20.13	20.09
		RB1#5	22.55	22.55	22.67	19.94	19.94	20.06
		RB3#0	22.87	22.48	22.76	20.26	19.87	20.15
		RB3#3	22.84	22.78	22.70	20.23	20.17	20.09
		RB6#0	21.64	21.79	21.73	19.03	19.18	19.12
3.0	QPSK	RB1#0	23.30	23.61	23.30	20.69	21.00	20.69
		RB1#8	23.58	23.35	23.47	20.97	20.74	20.86
		RB1#14	23.54	23.48	23.45	20.93	20.87	20.84
		RB6#0	22.76	22.53	22.58	20.15	19.92	19.97
		RB6#9	22.71	22.56	22.54	20.10	19.95	19.93
		RB15#0	22.59	22.55	22.61	19.98	19.94	20.00
	16QAM	RB1#0	22.94	22.42	22.47	20.33	19.81	19.86
		RB1#8	23.10	22.74	22.56	20.49	20.13	19.95
		RB1#14	22.87	22.57	22.45	20.26	19.96	19.84
		RB6#0	21.72	21.54	21.62	19.11	18.93	19.01
		RB6#9	21.54	21.63	21.46	18.93	19.02	18.85
		RB15#0	21.92	21.59	21.62	19.31	18.98	19.01

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	23.64	23.61	23.63	21.03	21.00	21.02
		RB1#13	23.99	23.72	23.77	21.38	21.11	21.16
		RB1#24	23.65	23.65	23.67	21.04	21.04	21.06
		RB15#0	22.75	22.72	22.90	20.14	20.11	20.29
		RB15#10	22.60	22.80	22.78	19.99	20.19	20.17
		RB25#0	22.64	22.60	22.89	20.03	19.99	20.28
	16QAM	RB1#0	22.68	23.03	22.70	20.07	20.42	20.09
		RB1#13	22.70	23.03	23.04	20.09	20.42	20.43
		RB1#24	22.68	23.04	22.65	20.07	20.43	20.04
		RB15#0	21.94	21.54	21.77	19.33	18.93	19.16
		RB15#10	21.72	21.67	21.74	19.11	19.06	19.13
		RB25#0	21.75	21.89	21.84	19.14	19.28	19.23
10.0	QPSK	RB1#0	23.84	23.96	23.89	21.23	21.35	21.28
		RB1#25	23.78	23.89	23.77	21.17	21.28	21.16
		RB1#49	23.87	23.73	23.79	21.26	21.12	21.18
		RB25#0	22.92	22.77	22.57	20.31	20.16	19.96
		RB25#25	22.90	22.81	22.55	20.29	20.20	19.94
		RB50#0	22.91	22.79	22.62	20.30	20.18	20.01
	16QAM	RB1#0	23.33	22.95	22.64	20.72	20.34	20.03
		RB1#25	23.51	22.91	22.72	20.90	20.30	20.11
		RB1#49	23.46	22.74	22.61	20.85	20.13	20.00
		RB25#0	21.81	21.61	21.55	19.20	19.00	18.94
		RB25#25	21.91	21.78	21.73	19.30	19.17	19.12
		RB50#0	21.92	21.92	21.61	19.31	19.31	19.00

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band12: Antenna Gain =-0.16dBi = -2.31dBd (0dBd=2.15dBi)
Cable Loss=0.3dB* (provided by the applicant)
Limit: ERP≤34.77dBm

LTE Band 17

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	23.33	23.38	23.36	20.72	20.77	20.75
		RB1#12	23.37	23.18	23.25	20.76	20.57	20.64
		RB1#24	23.34	22.71	23.02	20.73	20.10	20.41
		RB12#0	22.48	22.32	22.30	19.87	19.71	19.69
		RB12#6	22.36	22.28	22.30	19.75	19.67	19.69
		RB12#11	22.24	22.26	22.33	19.63	19.65	19.72
		RB25#0	22.27	22.66	22.32	19.66	20.05	19.71
	16QAM	RB1#0	22.16	22.49	22.28	19.55	19.88	19.67
		RB1#12	21.99	22.52	22.36	19.38	19.91	19.75
		RB1#24	21.28	21.51	21.41	18.67	18.90	18.80
		RB12#0	21.45	21.38	21.50	18.84	18.77	18.89
		RB12#6	21.50	21.33	20.78	18.89	18.72	18.17
		RB12#11	21.43	21.83	21.50	18.82	19.22	18.89
		RB25#0	20.78	20.58	21.16	18.17	17.97	18.55
10.0	QPSK	RB1#0	23.42	22.77	22.79	20.81	20.16	20.18
		RB1#24	23.37	23.08	22.93	20.76	20.47	20.32
		RB1#49	23.36	22.85	22.69	20.75	20.24	20.08
		RB25#0	22.66	21.93	22.02	20.05	19.32	19.41
		RB25#12	22.33	21.97	21.91	19.72	19.36	19.30
		RB25#24	21.84	21.59	20.99	19.23	18.98	18.38
		RB50#0	22.34	22.00	22.05	19.73	19.39	19.44
	16QAM	RB1#0	22.39	22.15	22.15	19.78	19.54	19.54
		RB1#24	22.13	22.09	21.93	19.52	19.48	19.32
		RB1#49	21.53	21.03	21.20	18.92	18.42	18.59
		RB25#0	23.33	23.38	23.36	20.72	20.77	20.75
		RB25#12	23.37	23.18	23.25	20.76	20.57	20.64
		RB25#24	23.34	22.71	23.02	20.73	20.10	20.41
		RB50#0	22.48	22.32	22.30	19.87	19.71	19.69

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band17: Antenna Gain =-0.16dBi = -2.31dBd (0dBd=2.15dBi)
Cable Loss=0.3dB* (provided by the applicant)
Limit: ERP≤34.77dBm

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.65	13
	Middle	7.56	13
	High	7.56	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	6.96	13
	Middle	7.50	13
	High	6.70	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.50	13
	Middle	3.52	13
	High	3.55	13
HSDPA (16QAM)	Low	3.90	13
	Middle	3.97	13
	High	4.86	13
HSUPA (QPSK)	Low	4.39	13
	Middle	4.63	13
	High	4.72	13
HSPA+	Low	4.12	13
	Middle	4.32	13
	High	4.33	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	7.56	13
	Middle	9.17	13
	High	8.53	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	6.79	13
	Middle	6.83	13
	High	3.65	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.43	13
	Middle	3.26	13
	High	3.33	13
HSDPA (16QAM)	Low	4.18	13
	Middle	3.77	13
	High	4.03	13
HSUPA (QPSK)	Low	4.57	13
	Middle	4.30	13
	High	4.63	13
HSPA+	Low	4.51	13
	Middle	4.63	13
	High	4.21	13

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.49	4.93	4.81	13	Pass
QPSK (100RB Size)	5.22	5.01	5.01	13	Pass
16QAM (1RB Size)	5.51	5.51	5.86	13	Pass
16QAM (100RB Size)	6.20	6.03	6.03	13	Pass

LTE Band 4 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.03	5.86	5.45	13	Pass
QPSK (100RB Size)	5.45	5.54	5.54	13	Pass
16QAM (1RB Size)	7.16	6.99	6.35	13	Pass
16QAM (100RB Size)	6.58	6.61	6.38	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.26	4.99	4.64	13	Pass
QPSK (100RB Size)	4.58	5.28	5.07	13	Pass
16QAM (1RB Size)	5.36	5.91	5.48	13	Pass
16QAM (100RB Size)	5.57	6.06	5.88	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.39	5.48	5.33	13	Pass
QPSK (50RB Size)	5.54	5.39	5.28	13	Pass
16QAM (1RB Size)	6.35	7.01	6.00	13	Pass
16QAM (50RB Size)	6.46	6.41	6.29	13	Pass

LTE Band 17 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.74	5.45	5.30	13	Pass
QPSK (50RB Size)	5.33	5.36	5.30	13	Pass
16QAM (1RB Size)	6.58	6.58	5.88	13	Pass
16QAM (50RB Size)	6.26	6.26	6.26	13	Pass

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

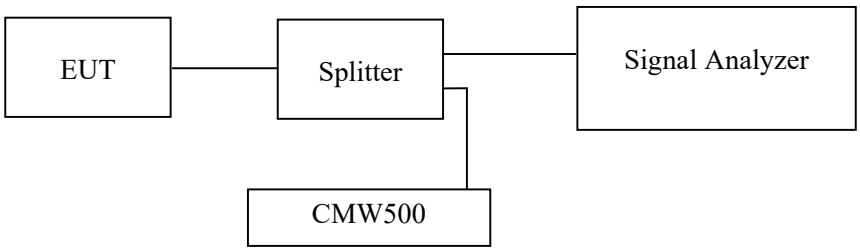
Applicable Standard

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

Test Procedure

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:	28.1~28.3 ℃
Relative Humidity:	56~57 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-17 to 2022-06-19.

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	246.00	312.00
	189	836.4	245.00	319.00
	251	848.8	245.00	315.00

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
EDGE(GMSK)	128	824.2	248.00	320.00
	189	836.4	256.00	337.00
	251	848.8	252.00	328.00

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.16	4.70
	836.4	4.16	4.70
	846.6	4.14	4.70
HSDPA	826.4	4.16	4.71
	836.4	4.16	4.70
	846.6	4.14	4.70
HSUPA	826.4	4.14	4.68
	836.4	4.16	4.68
	846.6	4.16	4.70

PCS Band (Part 24E)

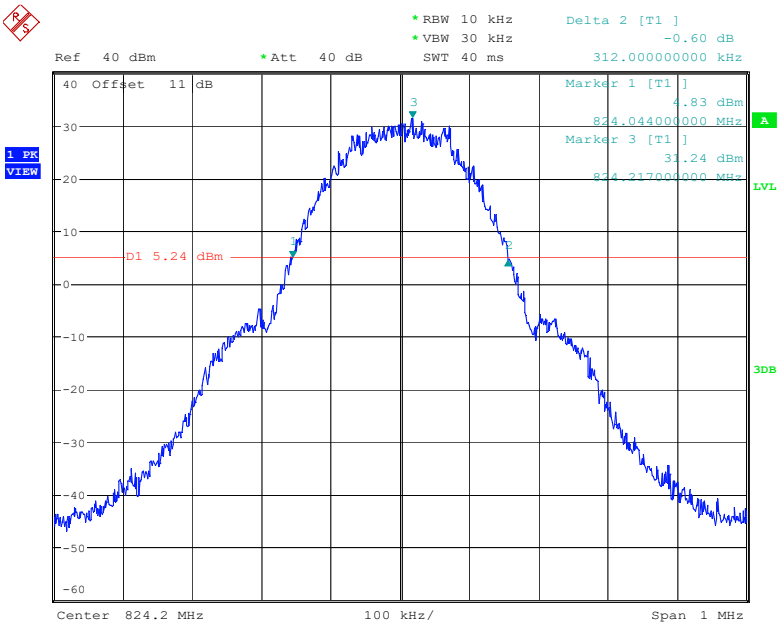
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	244.00	313.00
	661	1880.0	246.00	320.00
	810	1909.8	245.00	313.00

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
EDGE(GMSK)	512	1850.2	242.00	309.00
	661	1880.0	242.00	312.00
	810	1909.8	241.00	310.00

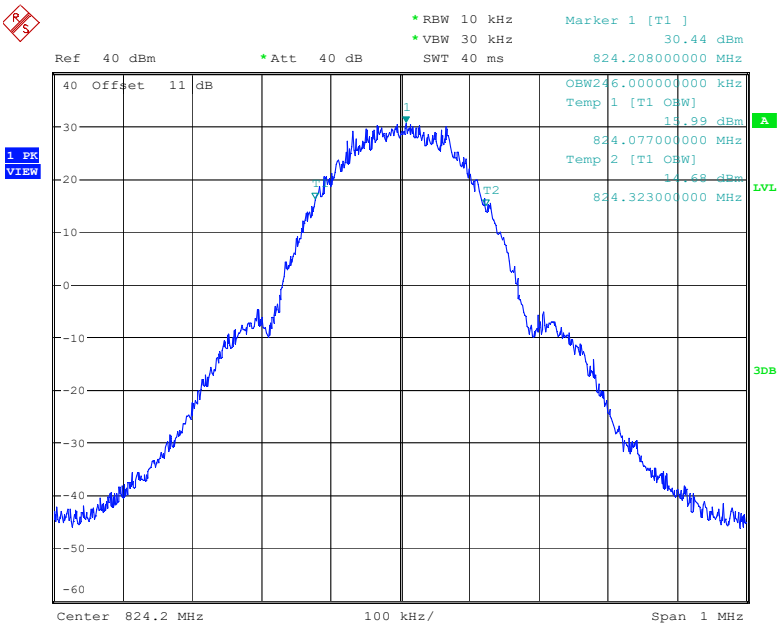
Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.14	4.70
	1880.0	4.14	4.68
	1907.6	4.14	4.70
HSDPA	1852.4	4.14	4.70
	1880.0	4.14	4.68
	1907.6	4.16	4.68
HSUPA	1852.4	4.16	4.70
	1880.0	4.14	4.68
	1907.6	4.16	4.70

Cellular Band (Part 22H)

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel

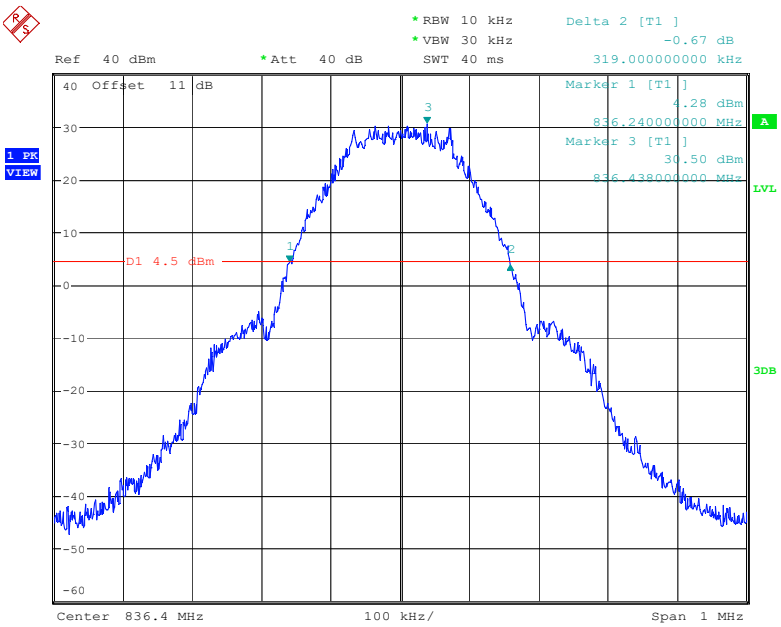


Date: 17.JUN.2022 23:50:55

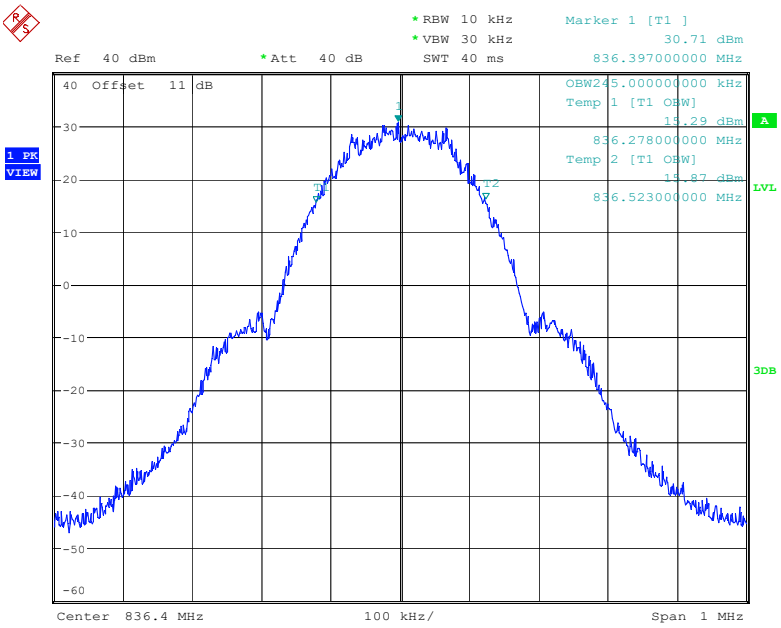


Date: 17.JUN.2022 23:50:29

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel

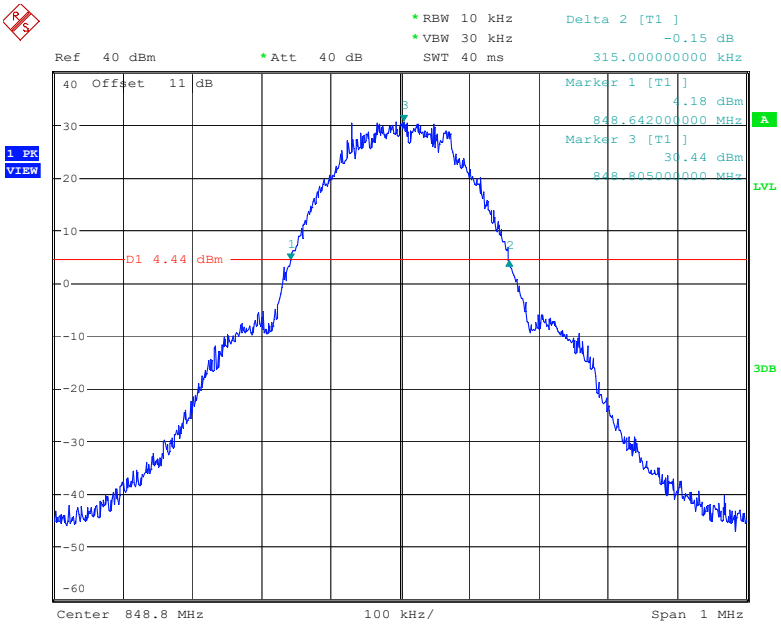


Date: 18.JUN.2022 00:01:18



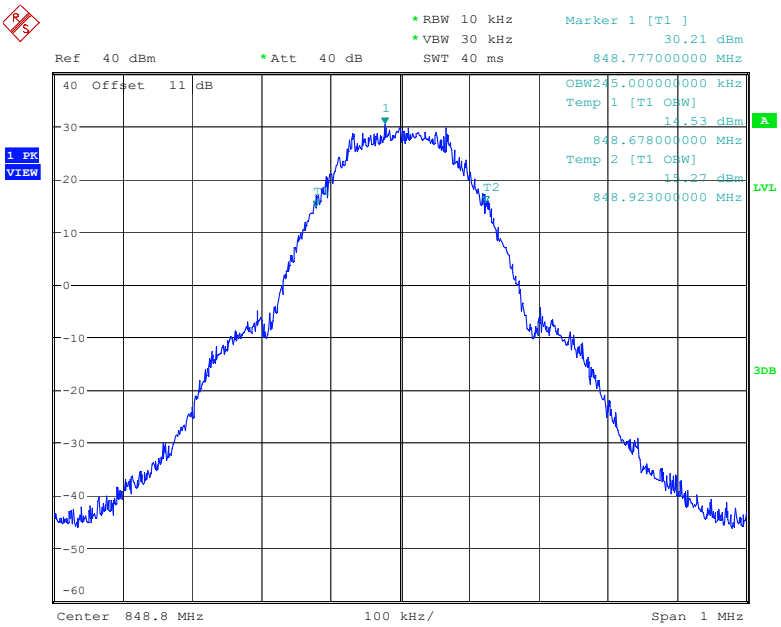
Date: 18.JUN.2022 00:00:53

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, High channel



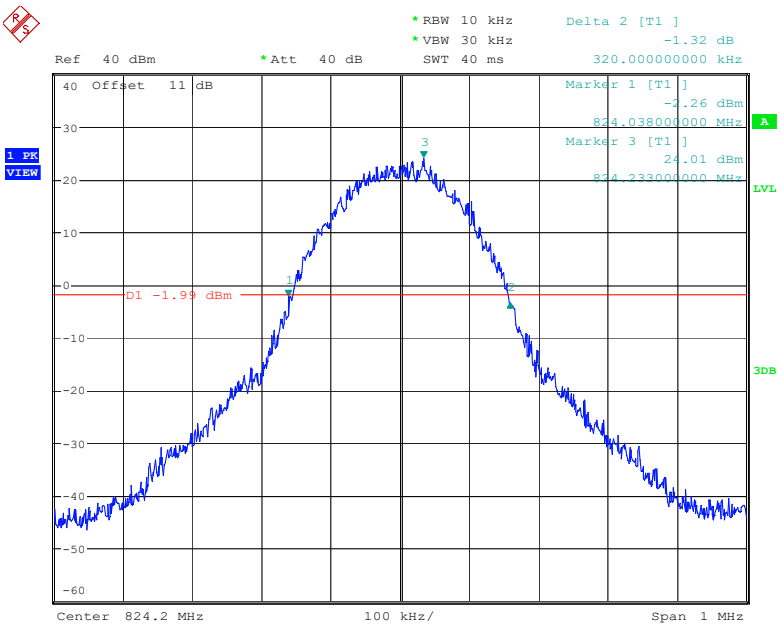
Date: 18.JUN.2022 00:04:03

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, High channel

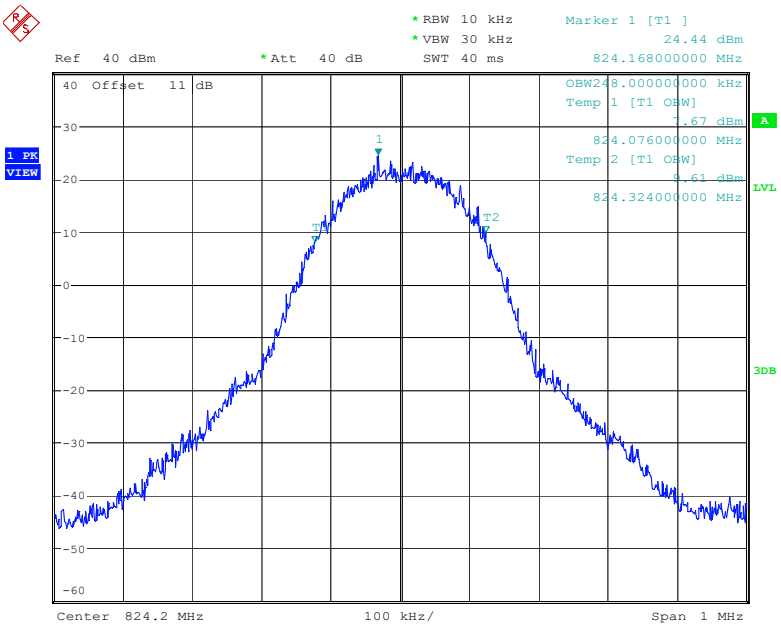


Date: 18.JUN.2022 00:03:37

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, Low channel

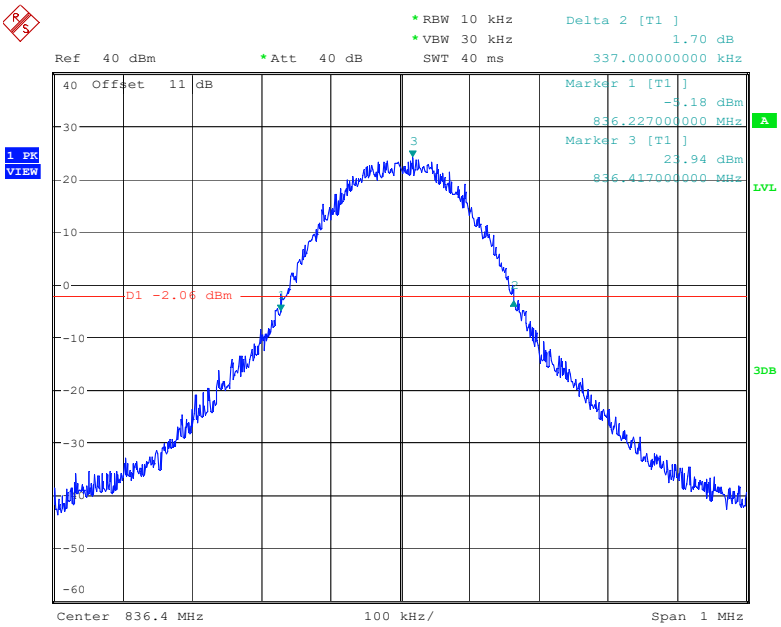


Date: 18.JUN.2022 00:10:49

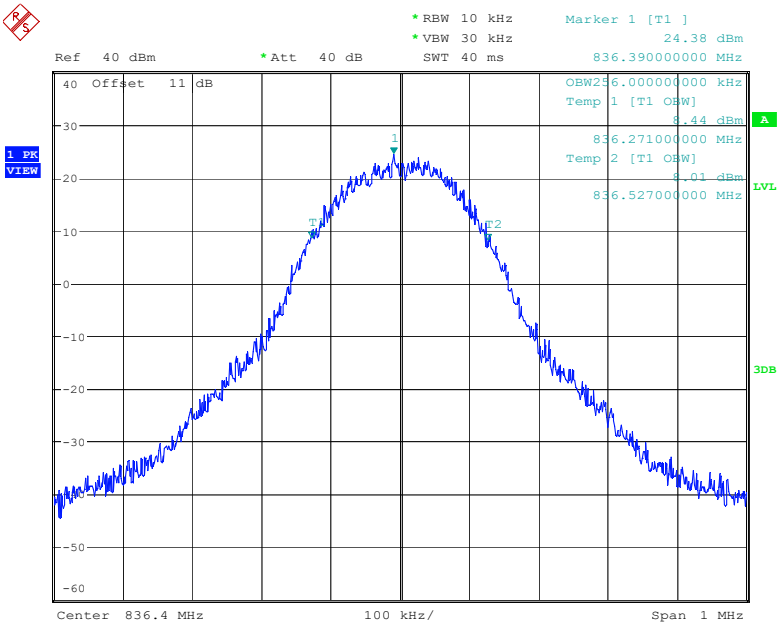


Date: 18.JUN.2022 00:10:23

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, Middle channel

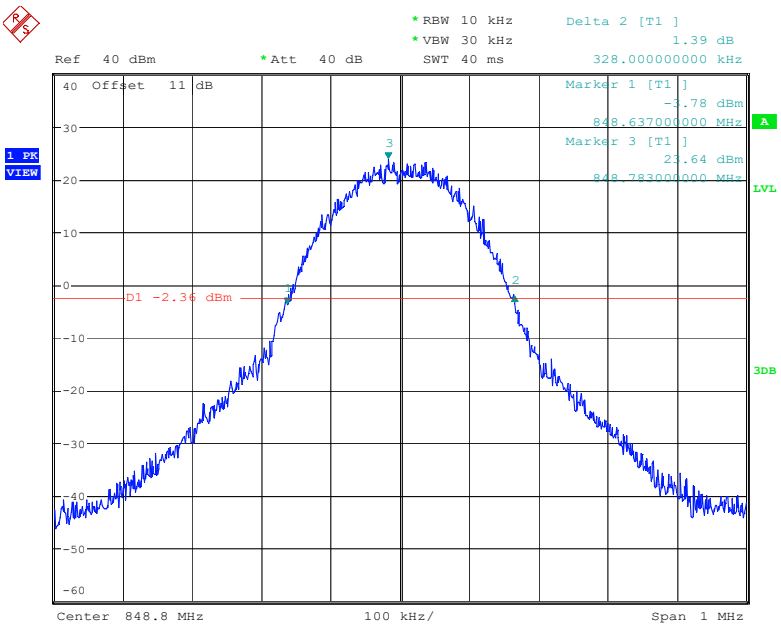


Date: 18.JUN.2022 00:33:44

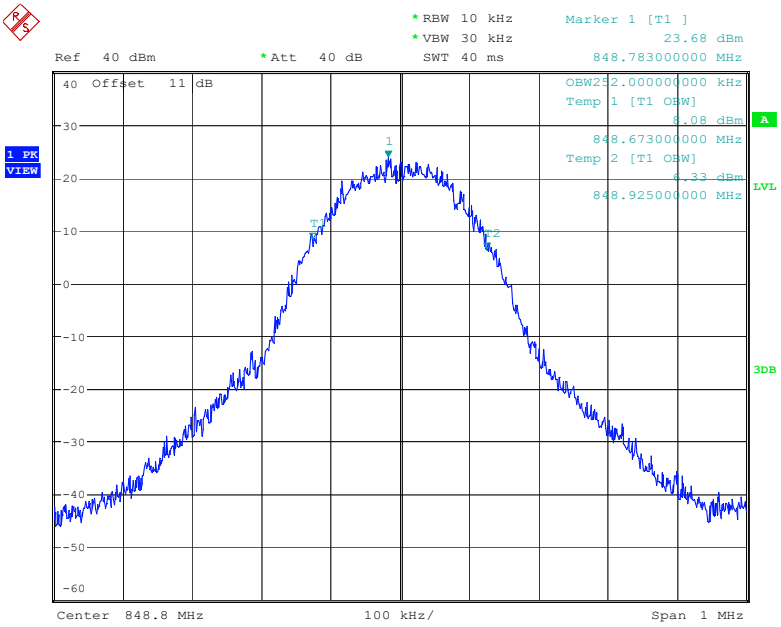


Date: 18.JUN.2022 00:13:03

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, High channel

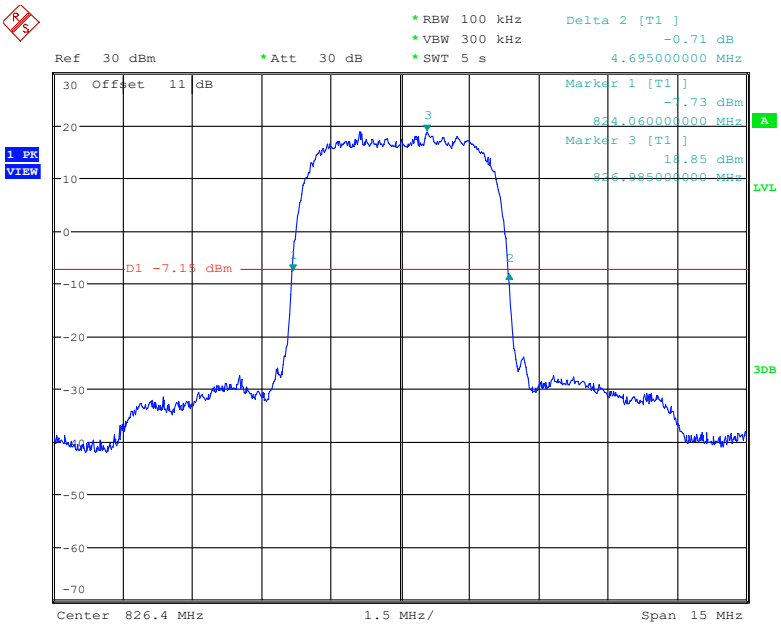


Date: 18.JUN.2022 00:15:29

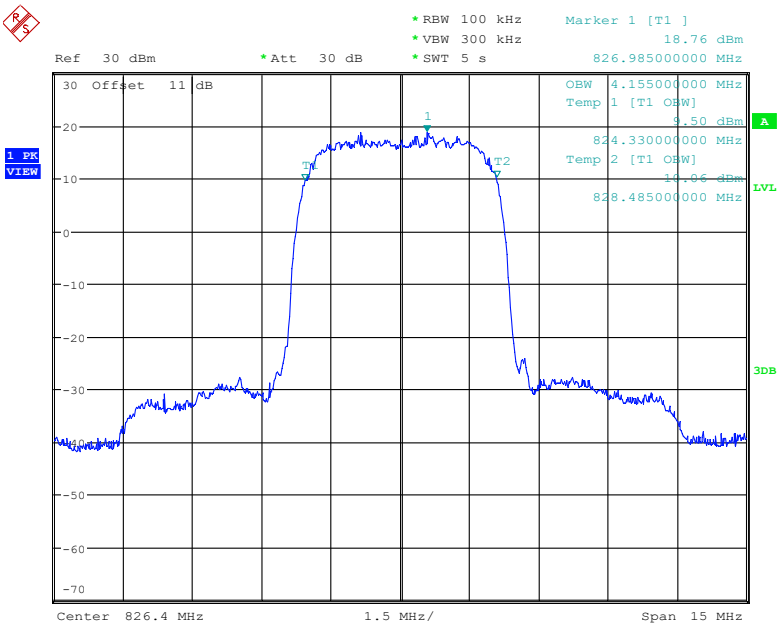


Date: 18.JUN.2022 00:15:03

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel

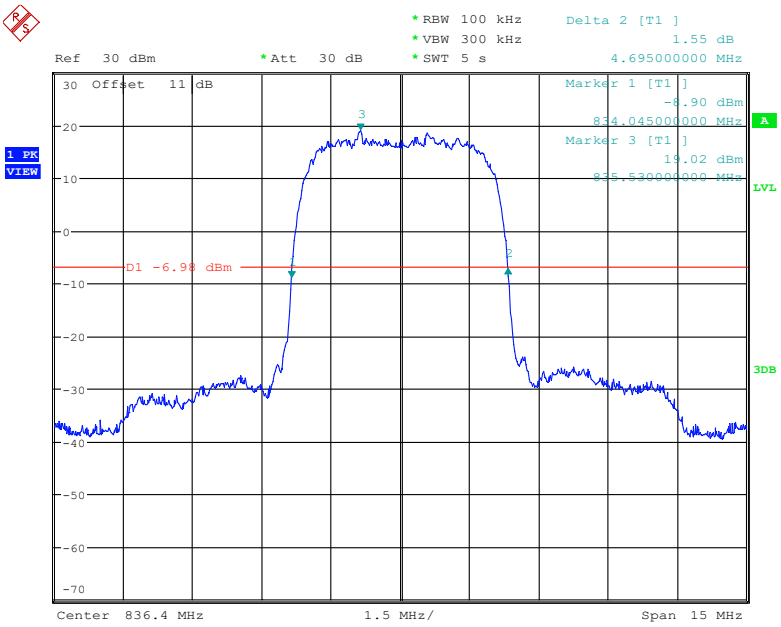


Date: 19.JUN.2022 14:05:07

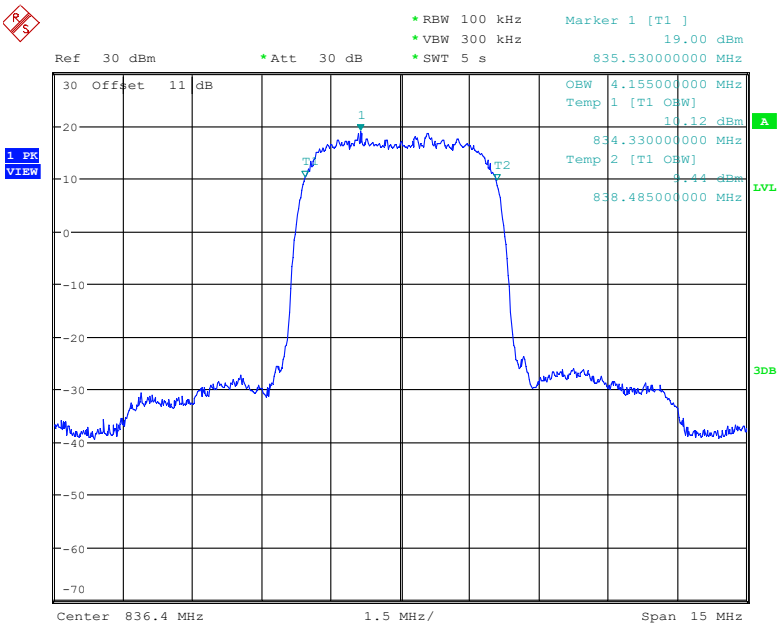


Date: 19.JUN.2022 14:04:31

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

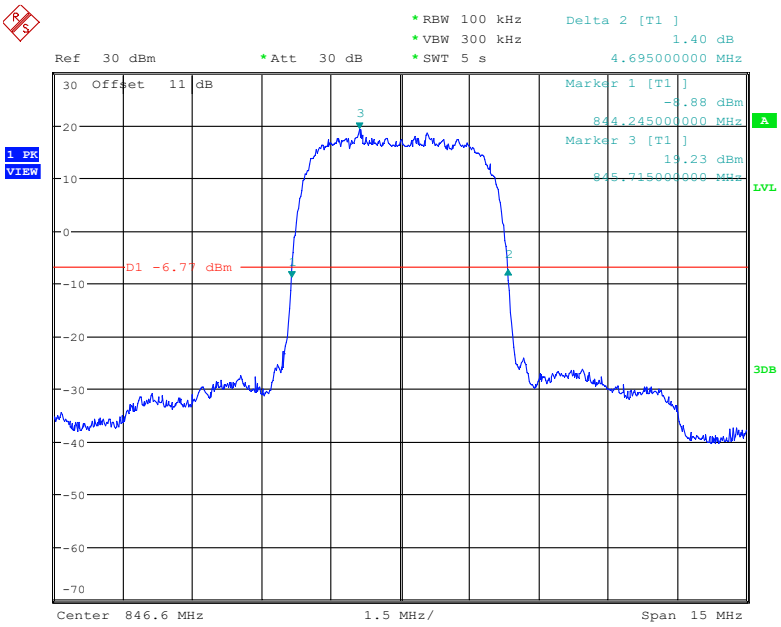


Date: 19.JUN.2022 14:15:18

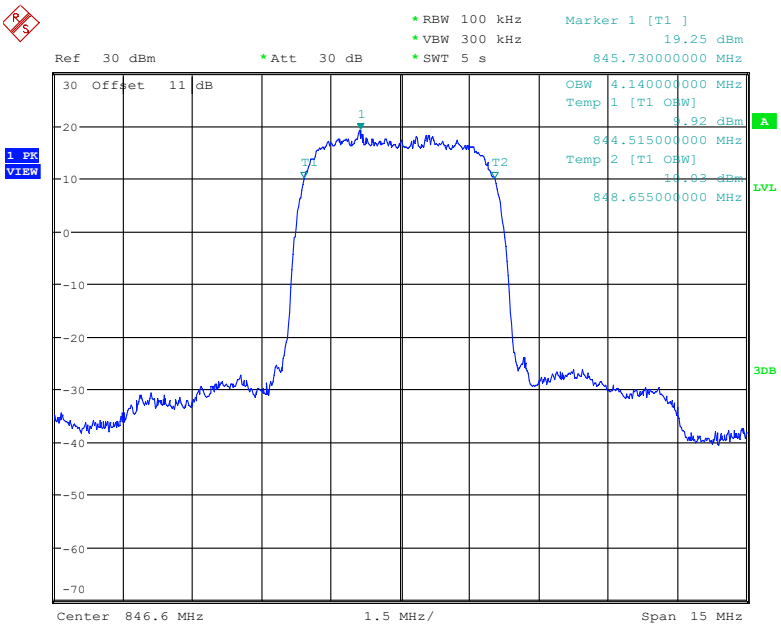


Date: 19.JUN.2022 14:14:42

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, High channel

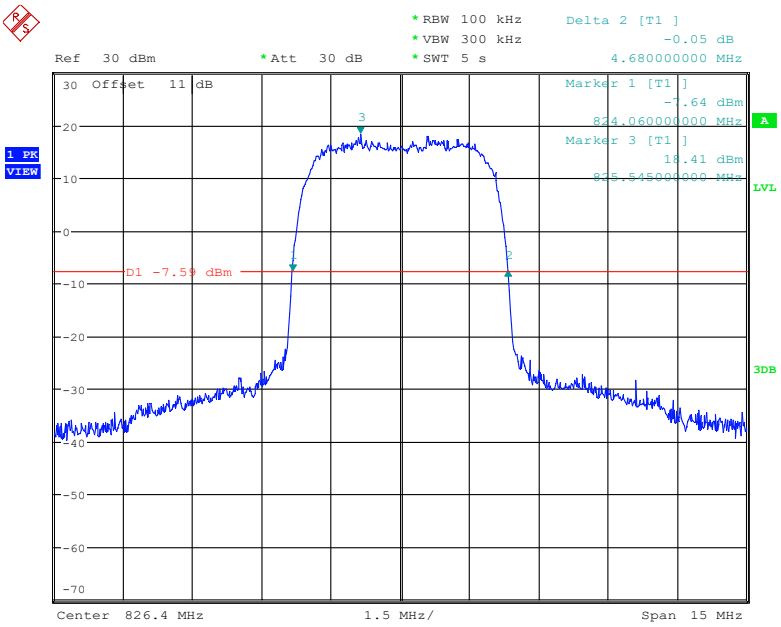


Date: 19.JUN.2022 14:25:31

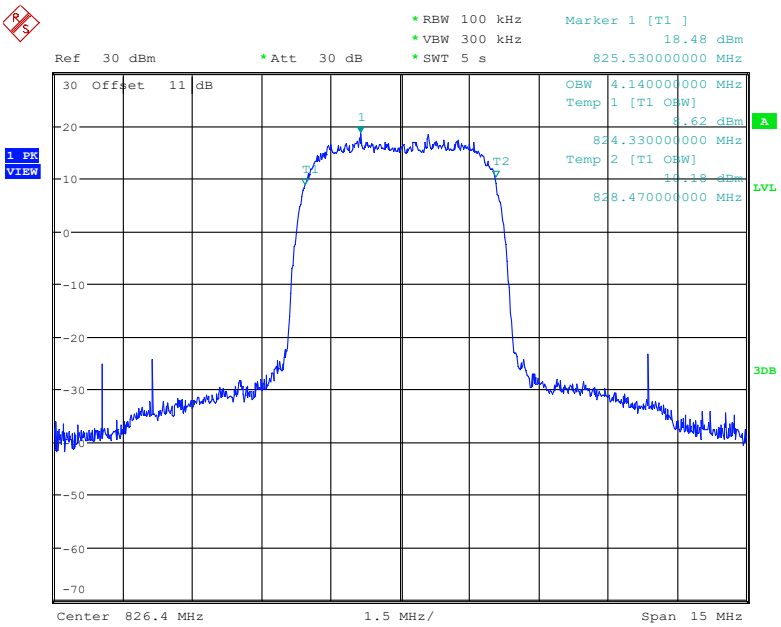


Date: 19.JUN.2022 14:24:55

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

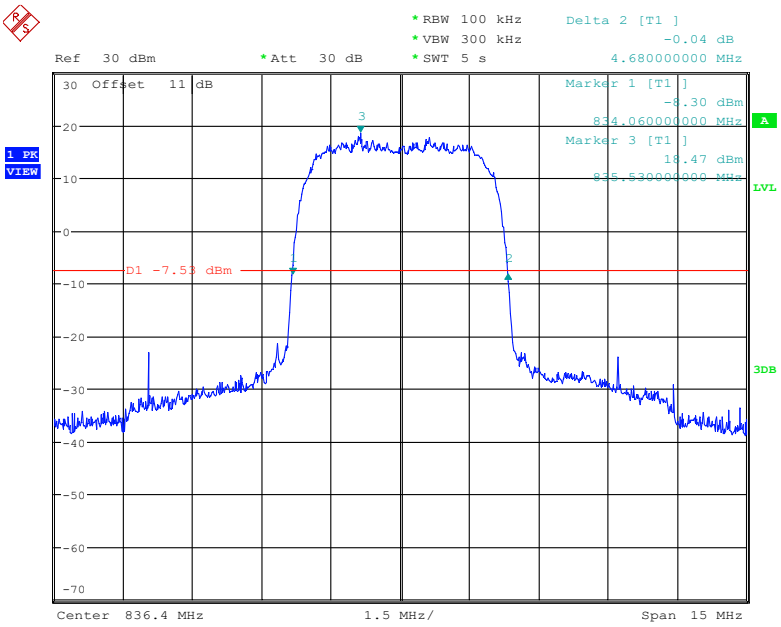


Date: 19.JUN.2022 14:08:26

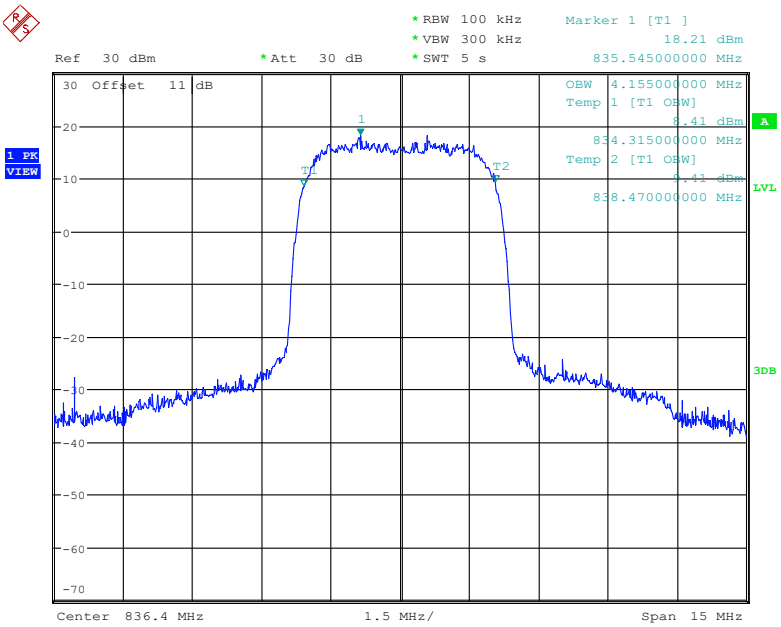


Date: 19.JUN.2022 14:07:50

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

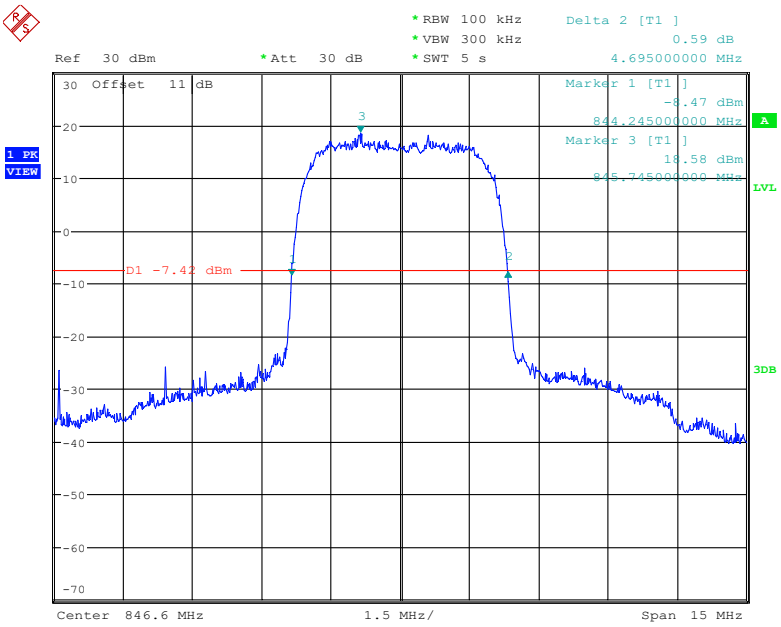


Date: 19.JUN.2022 14:18:27

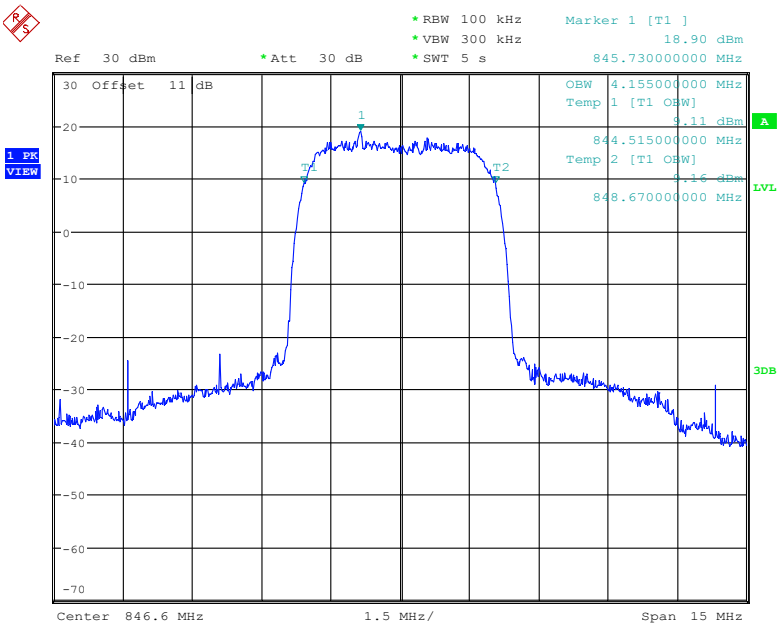


Date: 19.JUN.2022 14:17:51

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

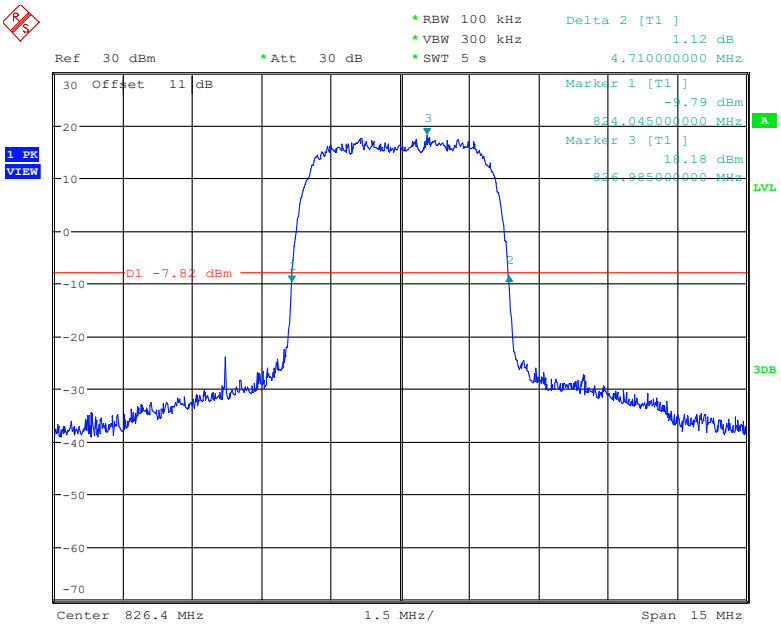


Date: 19.JUN.2022 14:29:35

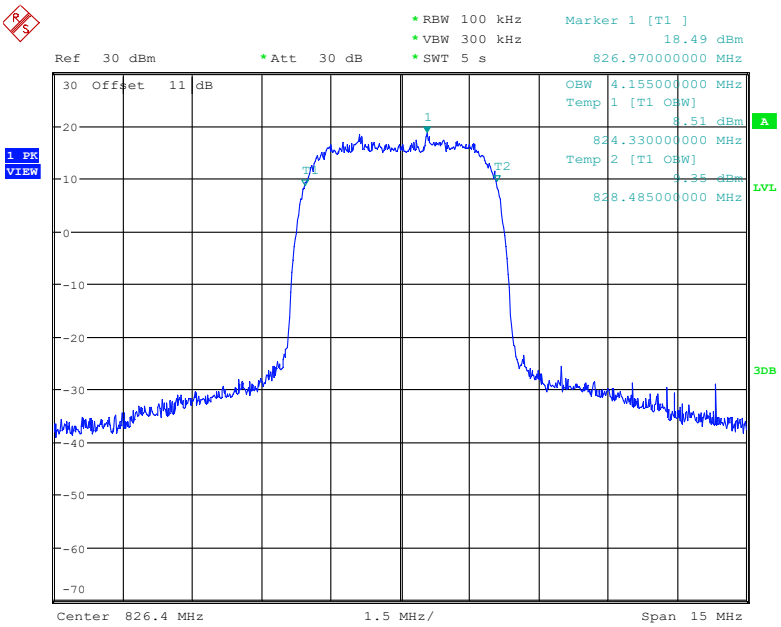


Date: 19.JUN.2022 14:28:59

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

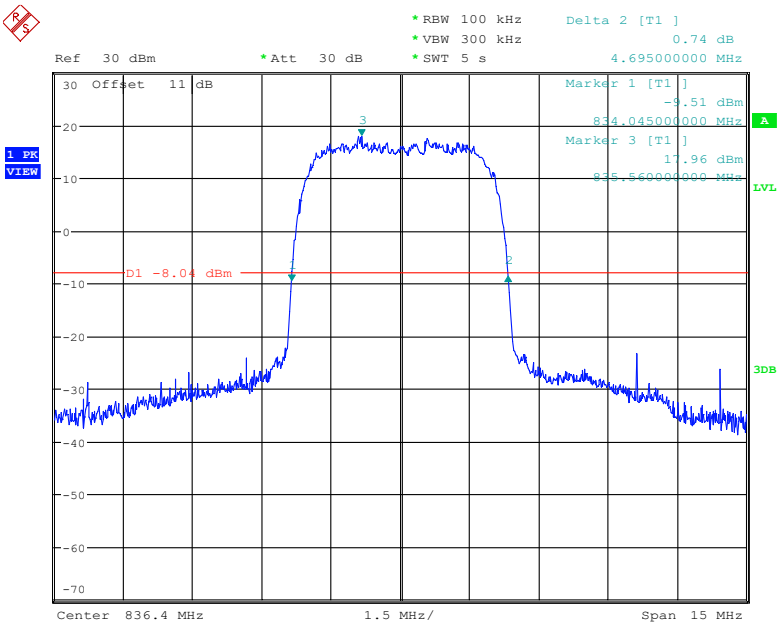


Date: 19.JUN.2022 14:11:33

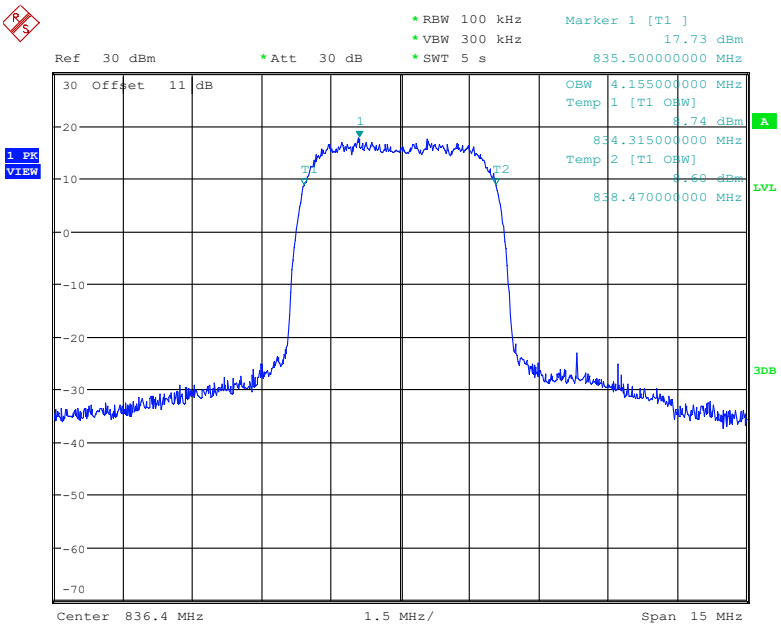


Date: 19.JUN.2022 14:10:57

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

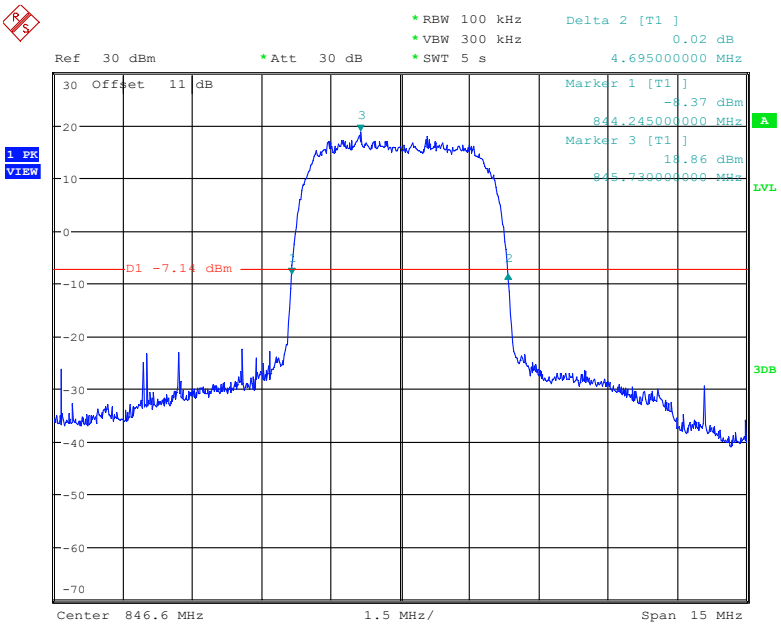


Date: 19.JUN.2022 14:21:42

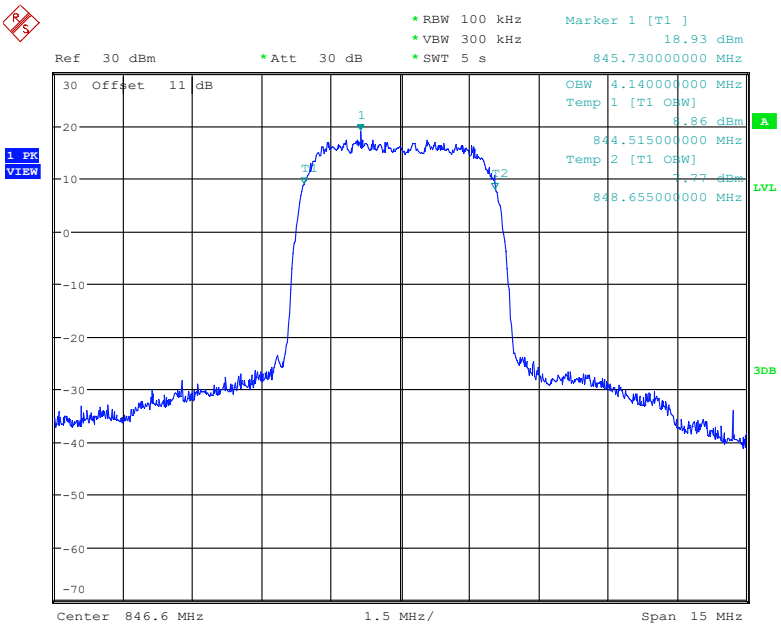


Date: 19.JUN.2022 14:21:06

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



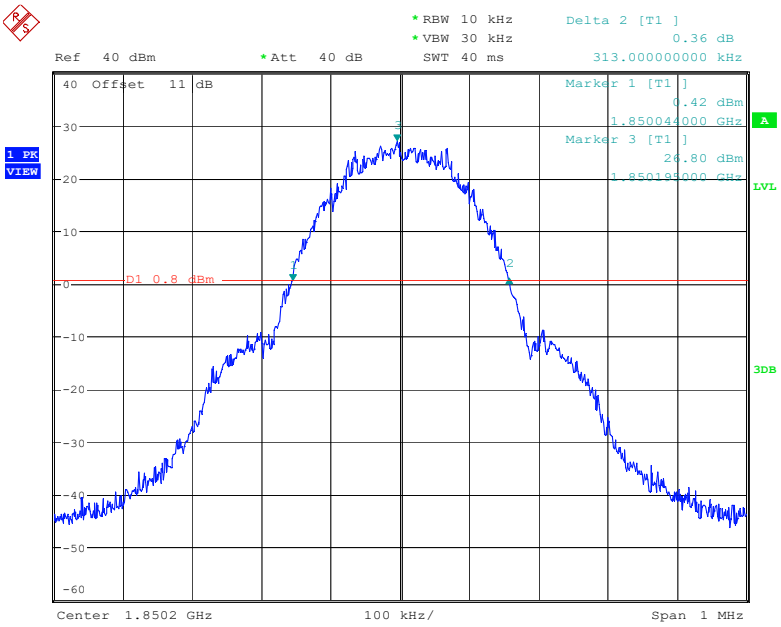
Date: 19.JUN.2022 14:33:21



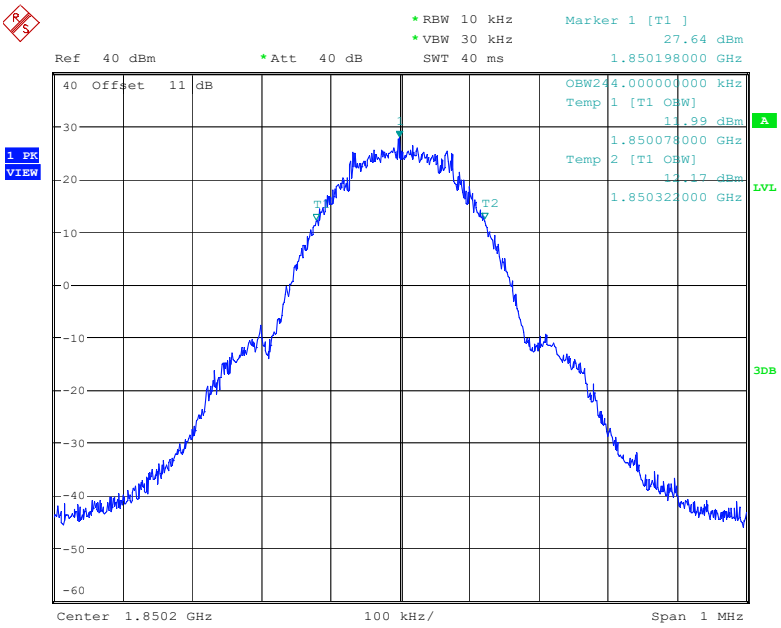
Date: 19.JUN.2022 14:32:45

PCS Band (Part 24E)

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel

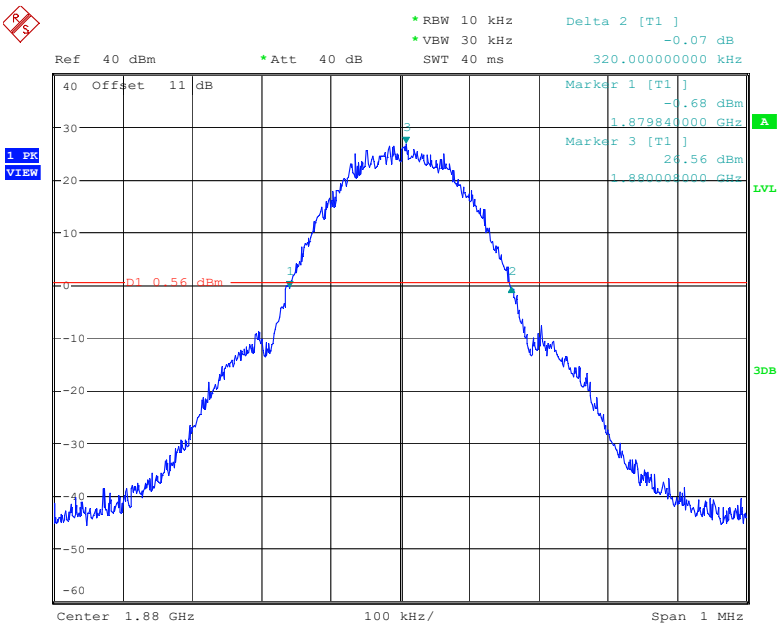


Date: 18.JUN.2022 00:40:50

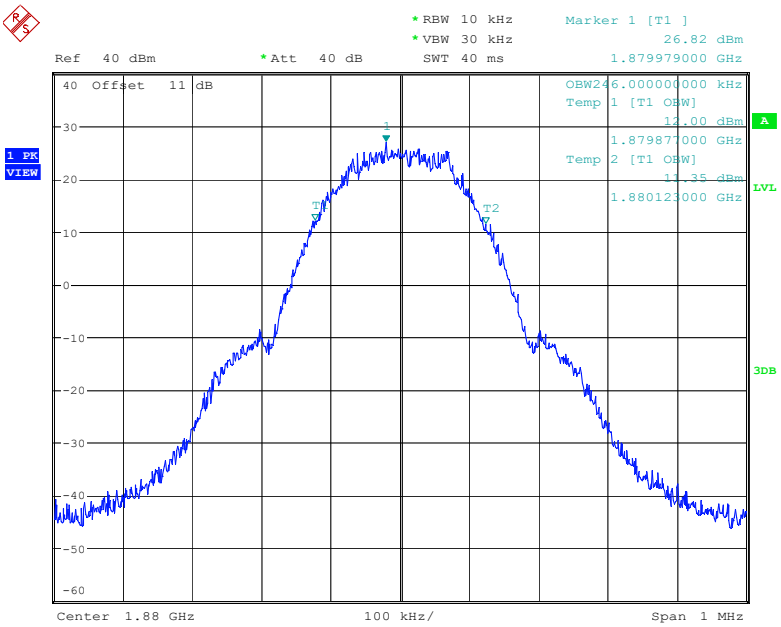


Date: 18.JUN.2022 00:40:24

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel

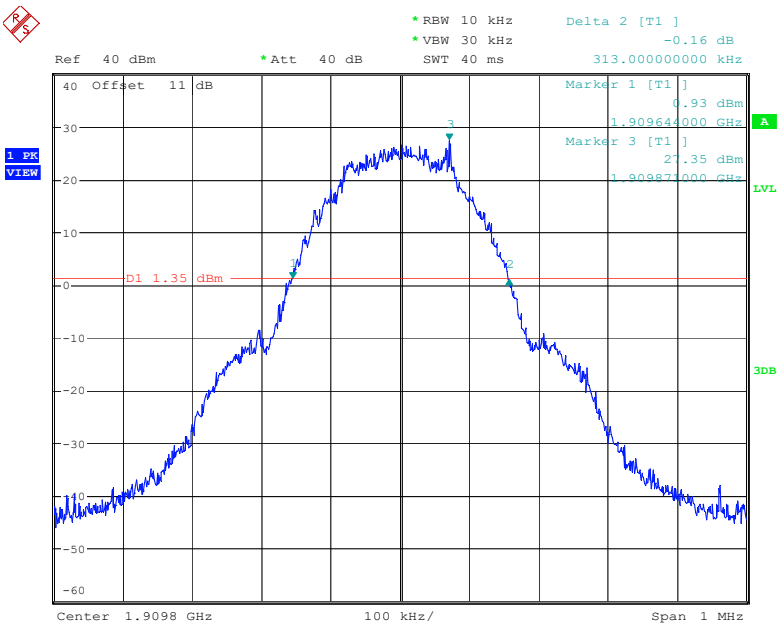


Date: 18.JUN.2022 00:44:03

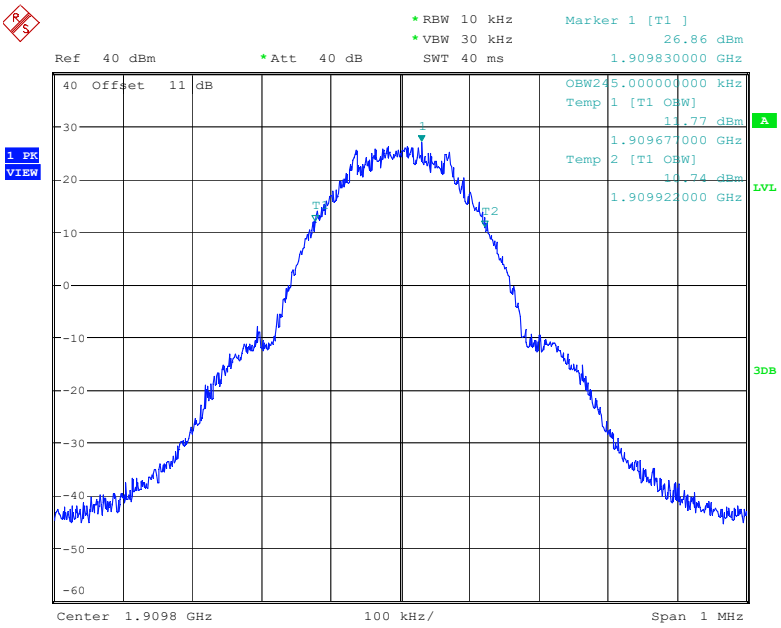


Date: 18.JUN.2022 00:43:37

26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode, High channel

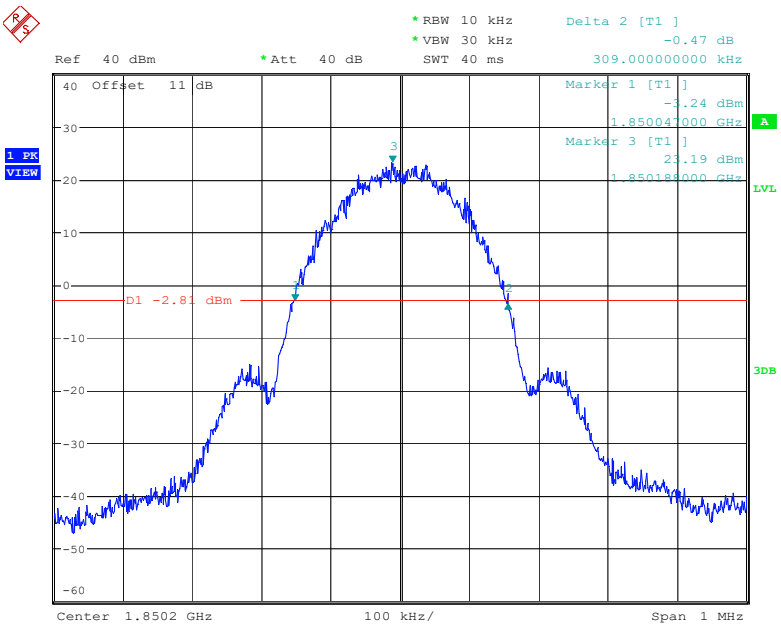


Date: 18.JUN.2022 00:46:39

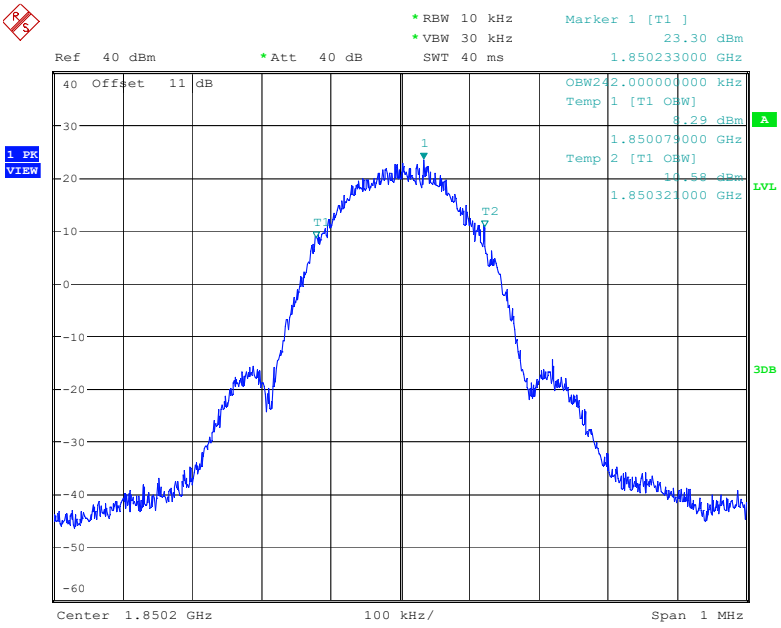


Date: 18.JUN.2022 00:46:13

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, Low channel

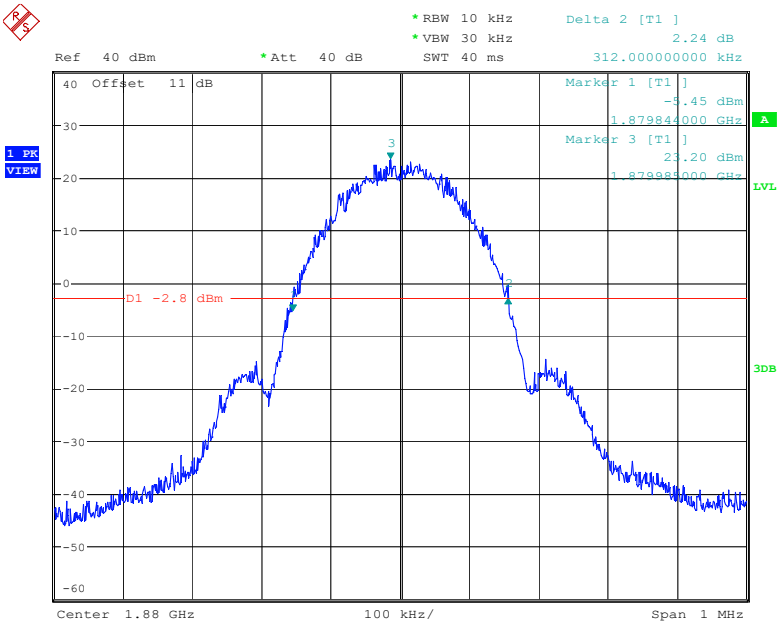


Date: 18.JUN.2022 00:52:31

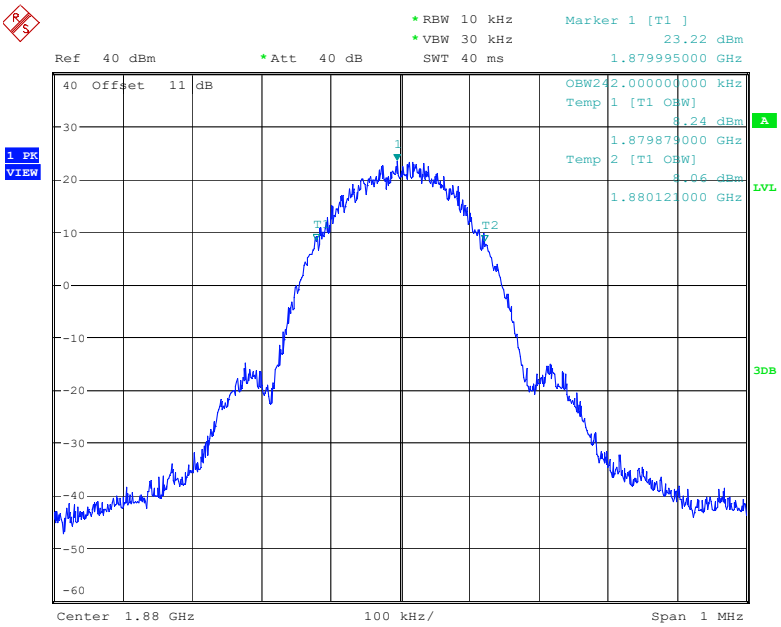


Date: 18.JUN.2022 00:52:05

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, Middle channel

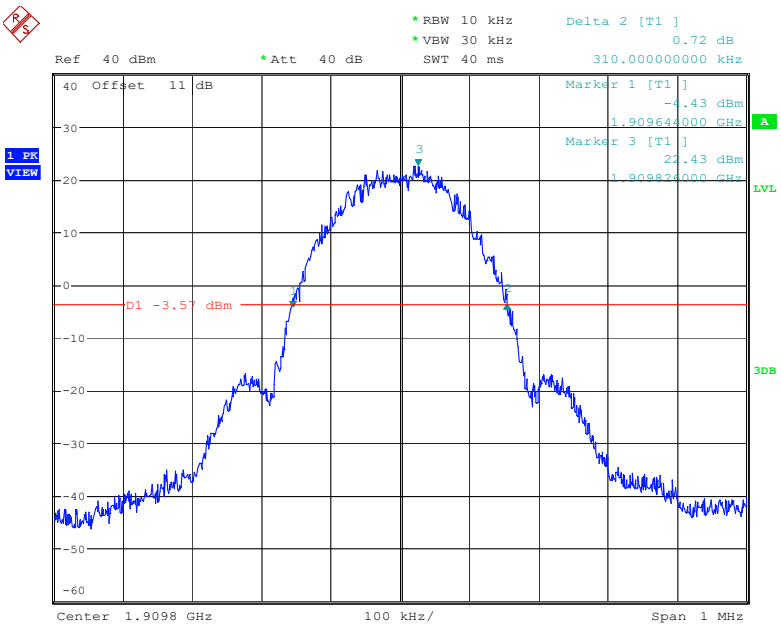


Date: 18.JUN.2022 00:54:30

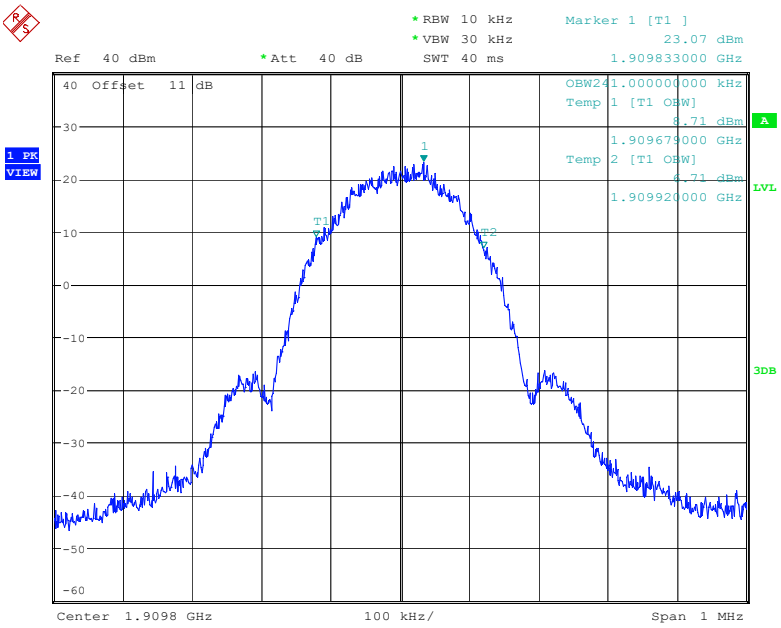


Date: 18.JUN.2022 00:54:04

26 dB Emissions &99% Occupied Bandwidth for EGPRS (8PSK) Mode, High channel

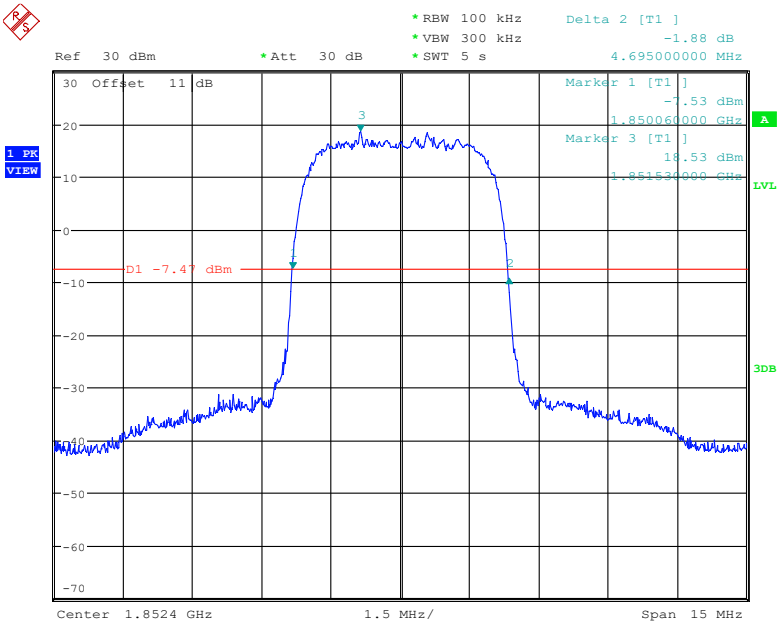


Date: 18.JUN.2022 00:56:08

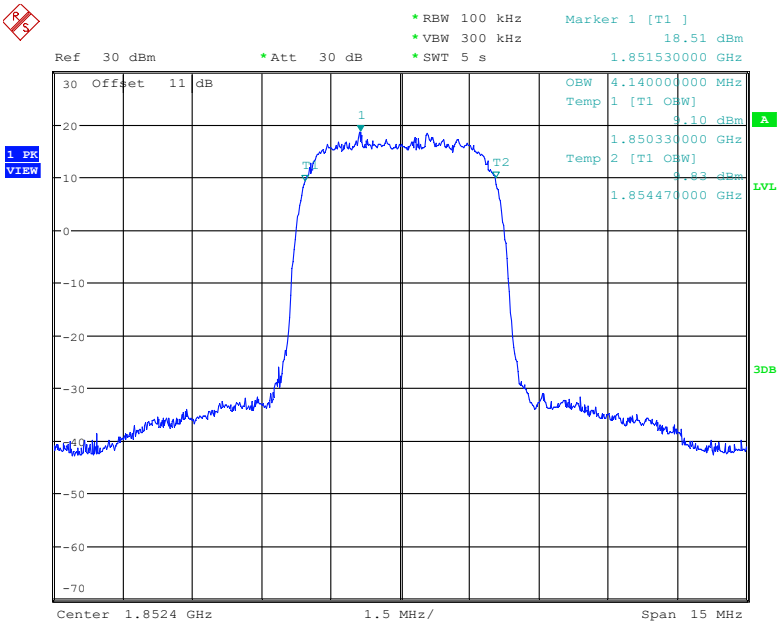


Date: 18.JUN.2022 00:55:42

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel

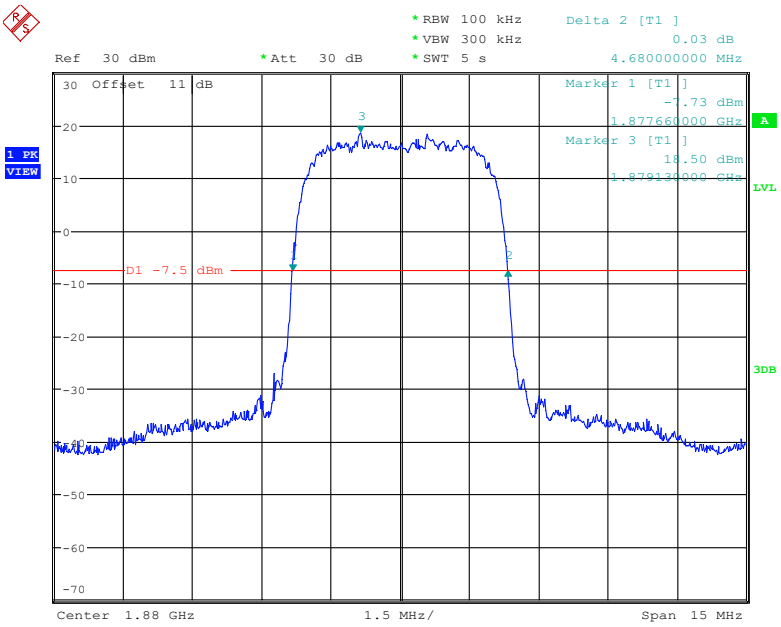


Date: 19.JUN.2022 13:33:06

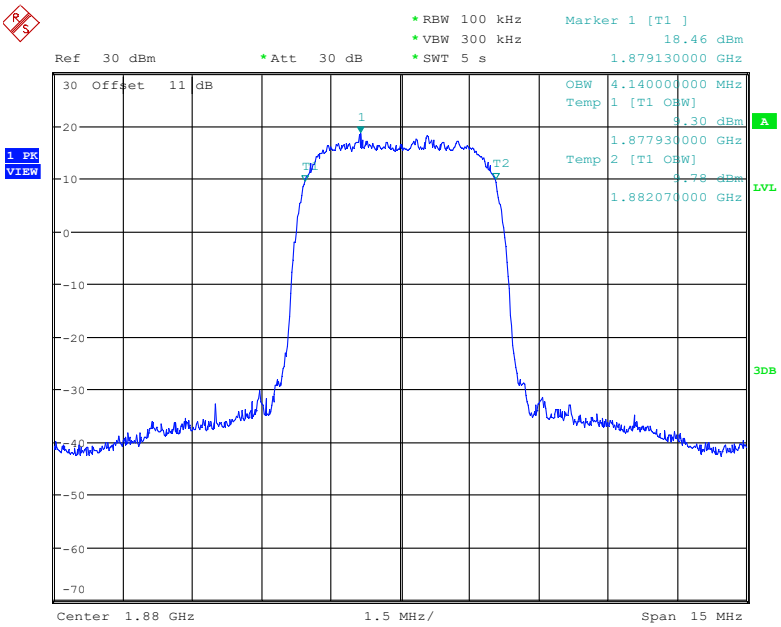


Date: 19.JUN.2022 13:32:30

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

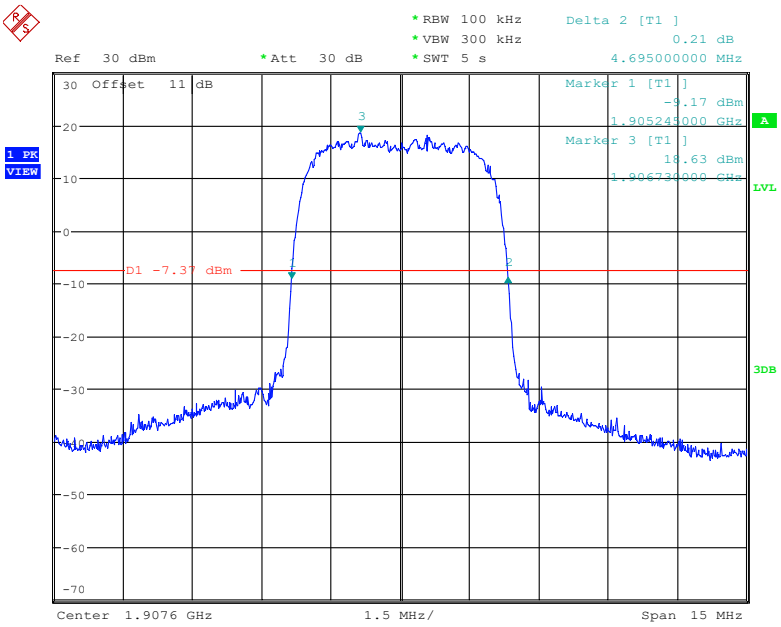


Date: 19.JUN.2022 13:36:42

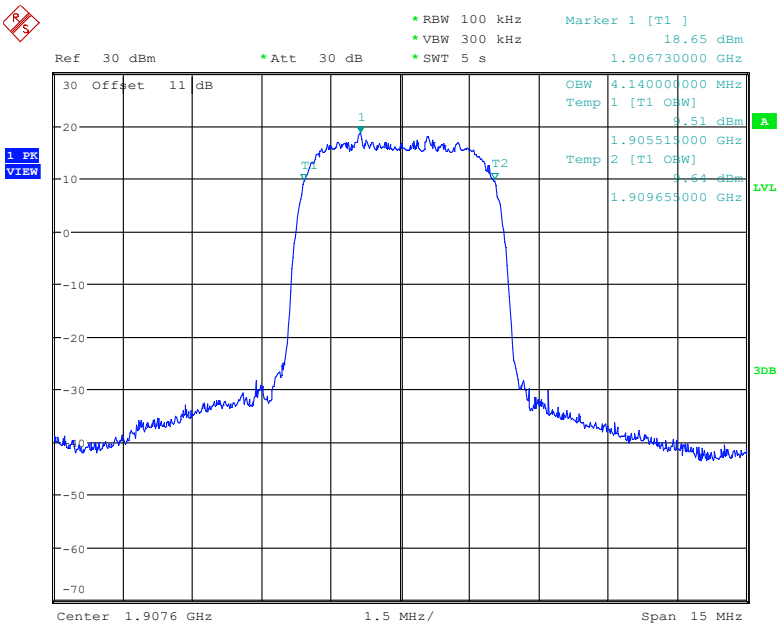


Date: 19.JUN.2022 13:36:06

26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode, High channel

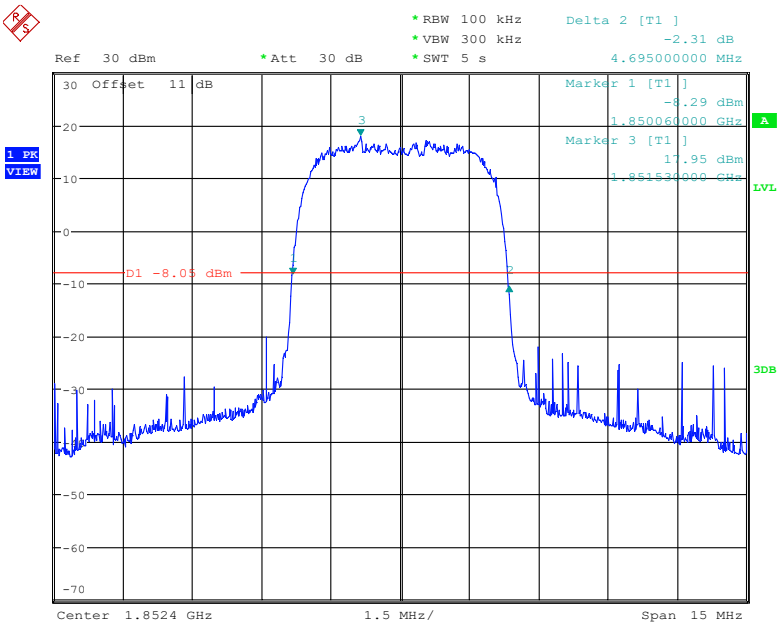


Date: 19.JUN.2022 13:39:56

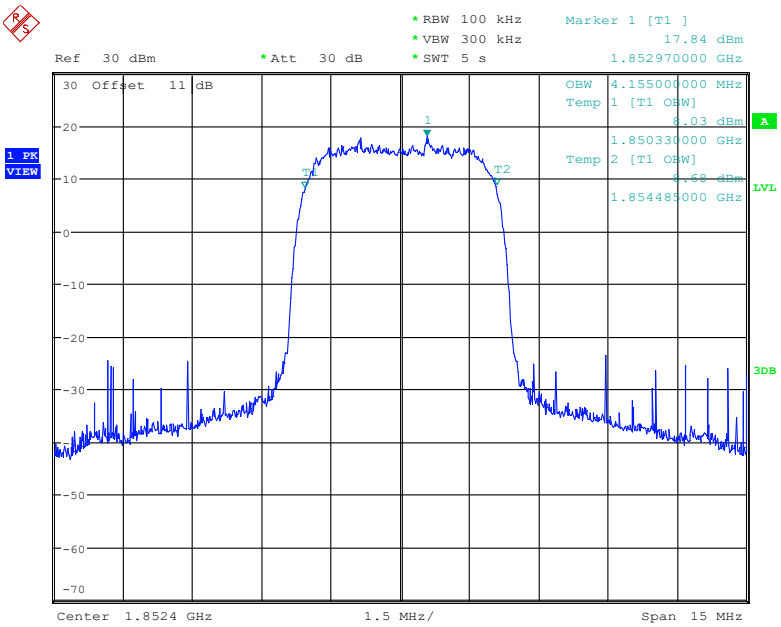


Date: 19.JUN.2022 13:39:20

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

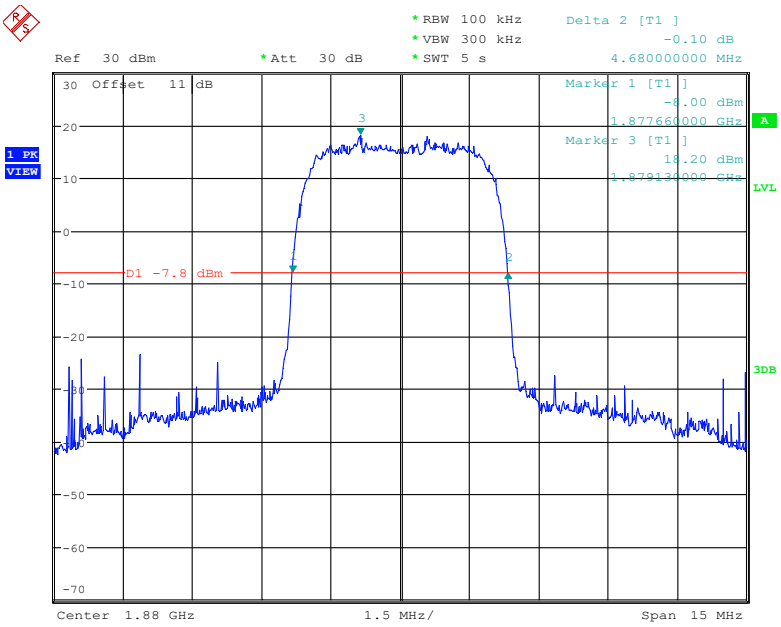


Date: 19.JUN.2022 14:01:07

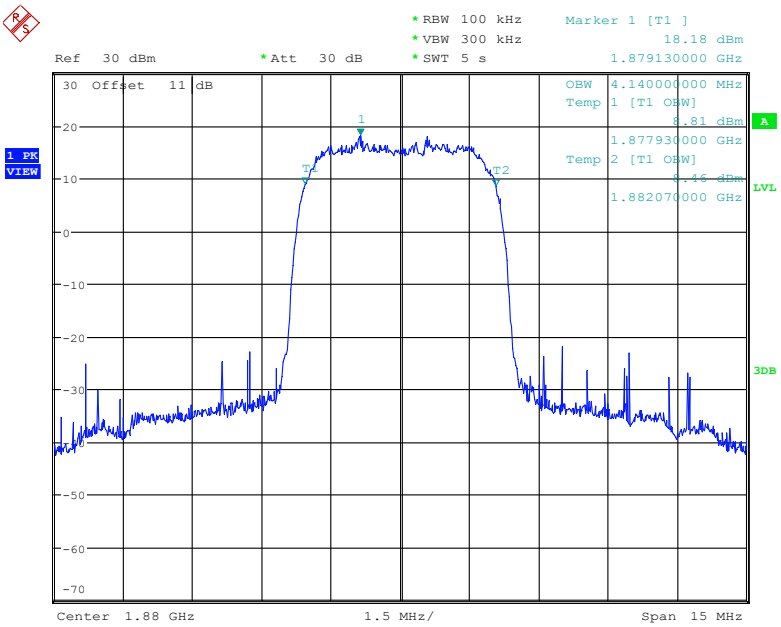


Date: 19.JUN.2022 14:00:31

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

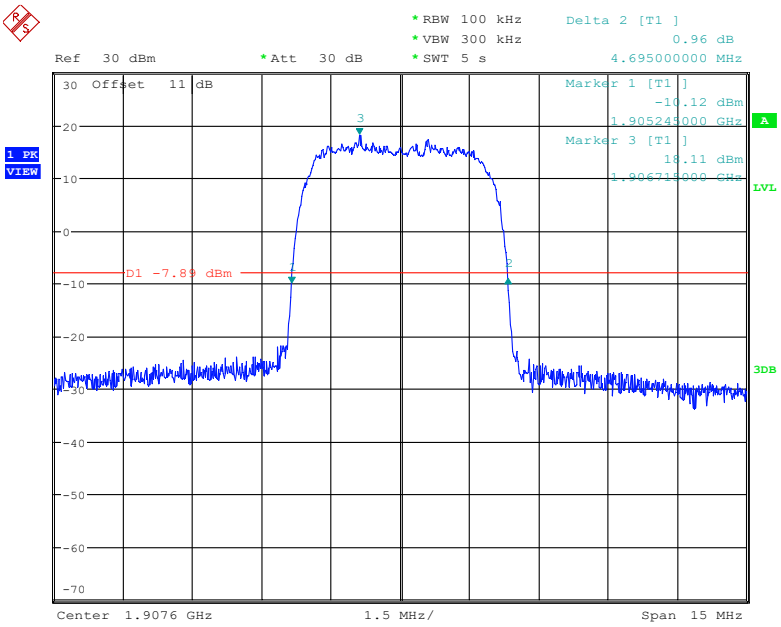


Date: 19.JUN.2022 13:46:25

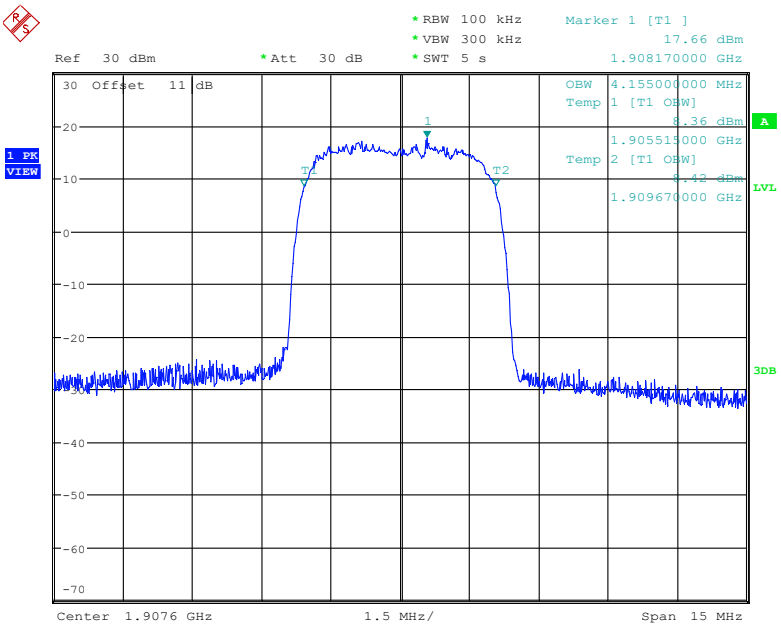


Date: 19.JUN.2022 13:45:48

26 dB Emissions &99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

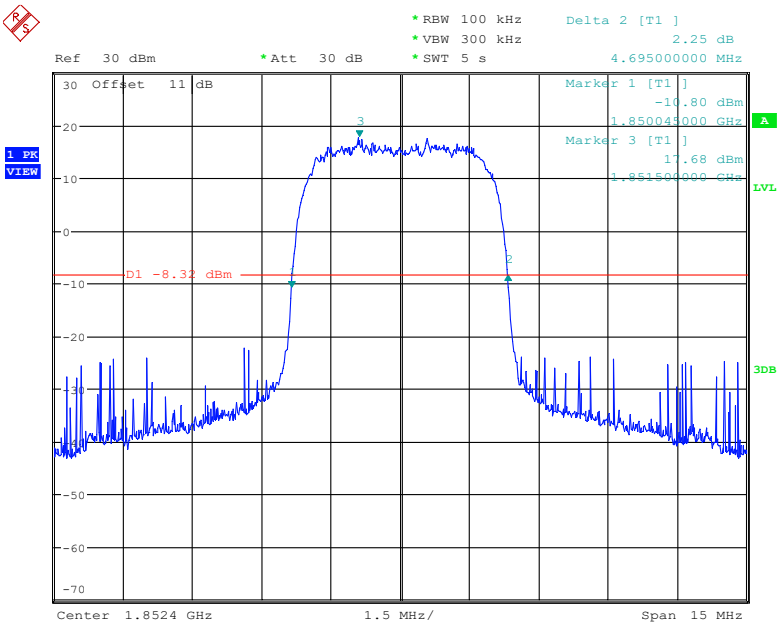


Date: 19.JUN.2022 13:48:25

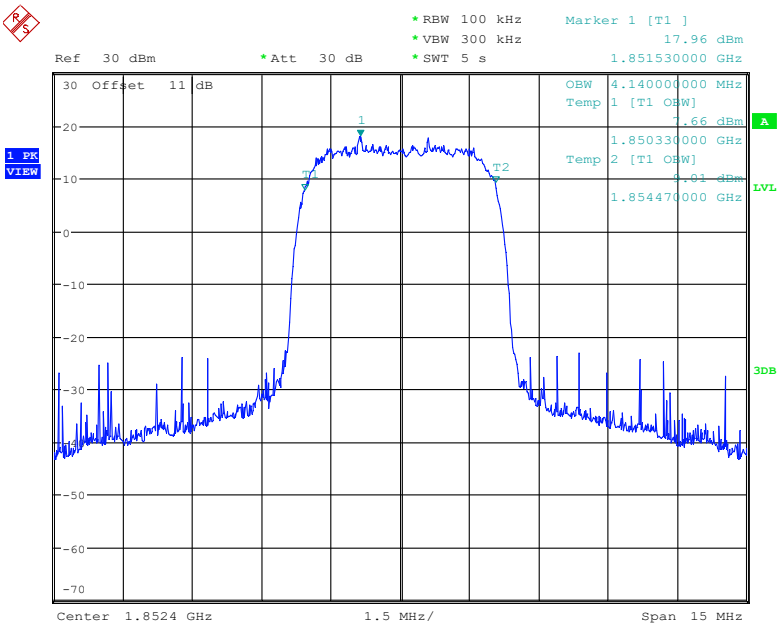


Date: 19.JUN.2022 13:47:49

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

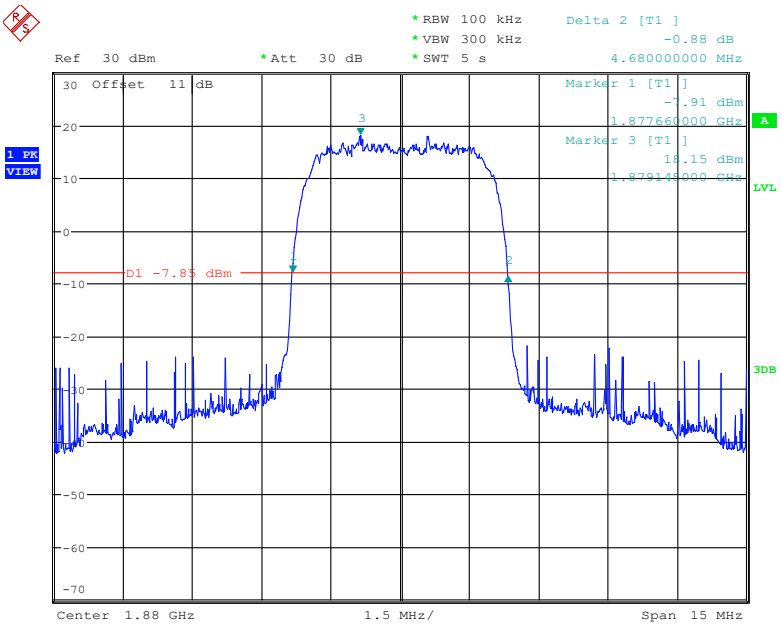


Date: 19.JUN.2022 13:56:20

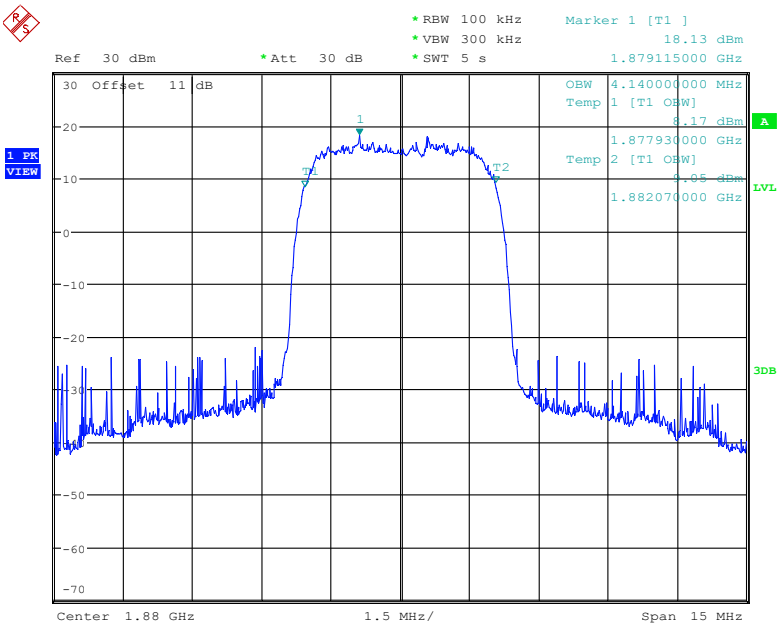


Date: 19.JUN.2022 13:55:44

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

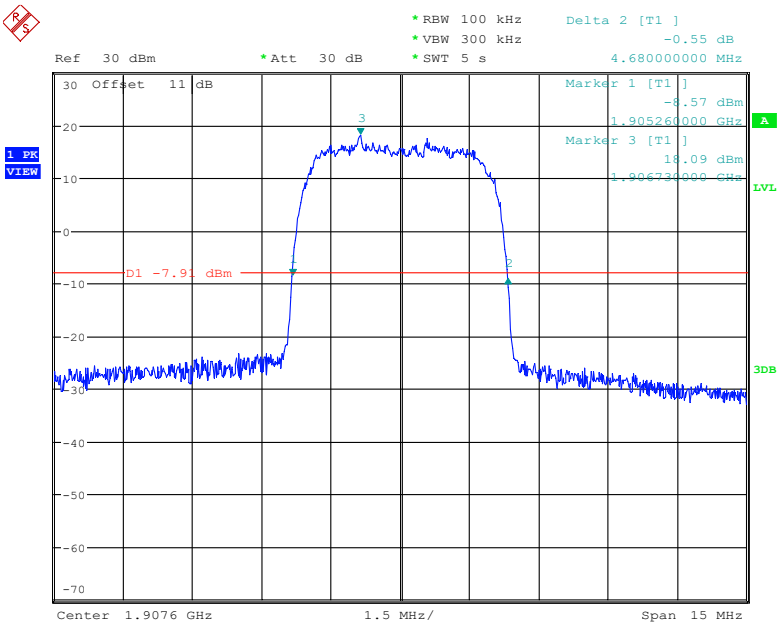


Date: 19.JUN.2022 13:54:15

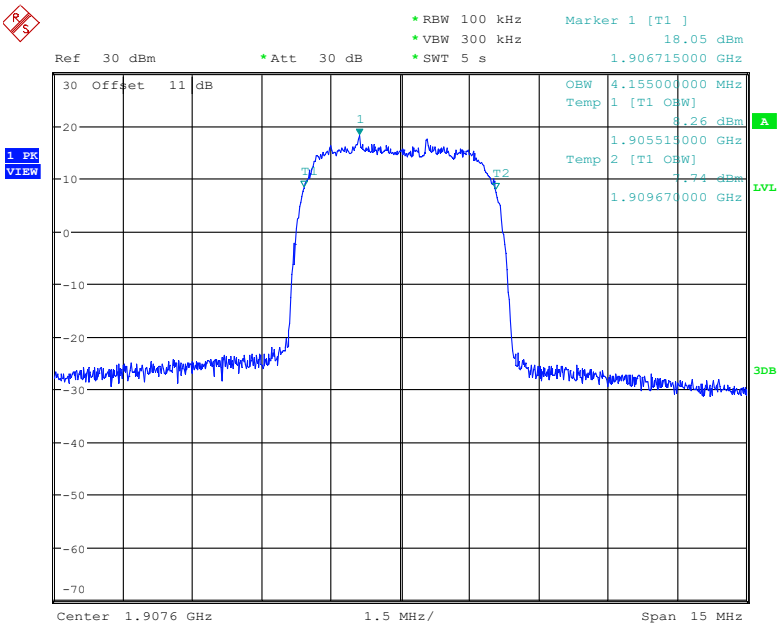


Date: 19.JUN.2022 13:53:39

26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 19.JUN.2022 13:51:12



Date: 19.JUN.2022 13:50:36

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	1.096	1.252	1.102	1.254	1.096	1.254
	16QAM	1.102	1.252	1.102	1.260	1.102	1.260
3 MHz	QPSK	2.695	3.012	2.695	3.012	2.695	3.000
	16QAM	2.683	2.988	2.695	3.012	2.695	3.012
5 MHz	QPSK	4.511	5.020	4.511	5.000	4.511	5.000
	16QAM	4.531	5.000	4.531	5.020	4.531	5.000
10 MHz	QPSK	8.942	9.760	8.942	9.760	8.942	9.760
	16QAM	8.982	9.800	8.942	9.840	8.942	9.800
15 MHz	QPSK	13.473	14.880	13.413	14.940	13.473	14.940
	16QAM	13.533	15.060	13.533	15.000	13.473	15.000
20 MHz	QPSK	17.964	19.600	17.964	19.600	17.884	19.520
	16QAM	18.044	19.840	18.044	19.920	17.964	19.760

LTE Band 4:

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	1.252	1.102	1.254	1.102	1.254
	16QAM	1.108	1.252	1.102	1.260	1.102	1.254
3 MHz	QPSK	2.695	3.012	2.695	3.012	2.695	2.988
	16QAM	2.695	3.012	2.683	3.000	2.683	3.024
5 MHz	QPSK	4.531	5.000	4.511	5.020	4.511	5.000
	16QAM	4.531	5.020	4.511	4.980	4.551	5.020
10 MHz	QPSK	8.942	9.760	8.942	9.760	8.942	9.720
	16QAM	8.942	9.800	8.942	9.840	8.982	9.840
15 MHz	QPSK	13.413	14.940	13.473	14.940	13.473	14.940
	16QAM	13.473	14.940	13.533	15.000	13.473	15.000
20 MHz	QPSK	17.964	19.360	18.044	19.600	17.964	19.520
	16QAM	18.044	19.680	18.044	19.760	17.964	19.840

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	5.020	4.511	5.020	4.511	5.000
	16QAM	4.551	5.020	4.531	5.020	4.531	5.020
10 MHz	QPSK	8.942	9.800	8.942	9.760	8.942	9.760
	16QAM	8.982	9.840	8.942	9.800	8.942	9.800
15 MHz	QPSK	13.473	15.060	13.533	14.940	13.473	14.880
	16QAM	13.593	15.180	13.593	15.120	13.473	14.880
20 MHz	QPSK	17.964	19.520	17.964	19.680	17.884	19.520
	16QAM	17.964	19.840	17.964	19.920	17.964	19.680

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	1.102	1.254	1.102	1.254	1.096	1.248
	16QAM	1.090	1.248	1.102	1.260	1.108	1.260
3 MHz	QPSK	2.695	3.012	2.695	3.012	2.695	3.012
	16QAM	2.695	3.012	2.683	3.000	2.683	3.000
5 MHz	QPSK	4.511	5.020	4.511	5.000	4.511	5.020
	16QAM	4.531	5.040	4.531	5.040	4.551	5.020
10 MHz	QPSK	8.942	9.800	8.942	9.720	8.942	9.760
	16QAM	8.982	9.800	8.942	9.680	8.942	9.680

LTE Band 17:

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	5.000	4.511	4.980	4.511	5.020
	16QAM	4.531	5.040	4.531	5.000	4.551	5.040
10 MHz	QPSK	8.942	9.760	8.942	9.760	8.942	9.760
	16QAM	8.942	9.800	8.942	9.800	8.942	9.800

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

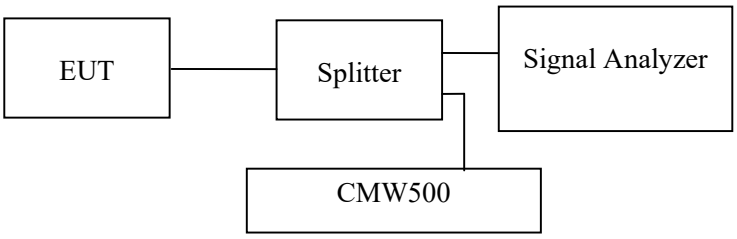
Applicable Standard

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

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 10^{th} harmonic.



Test Data

Environmental Conditions

Temperature:	28.1~28.3 ℃
Relative Humidity:	56~57 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-18 to 2022-06-19.

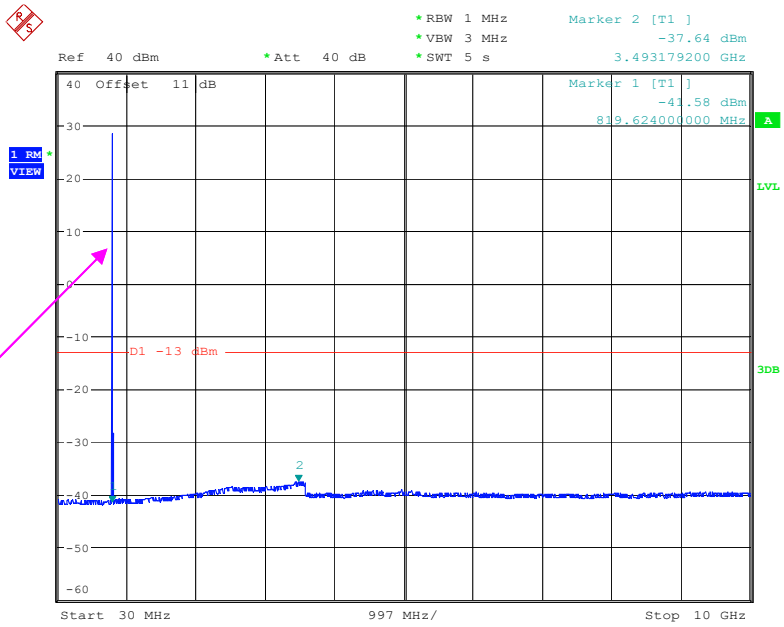
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

Cellular Band (Part 22H)
Low Channel:

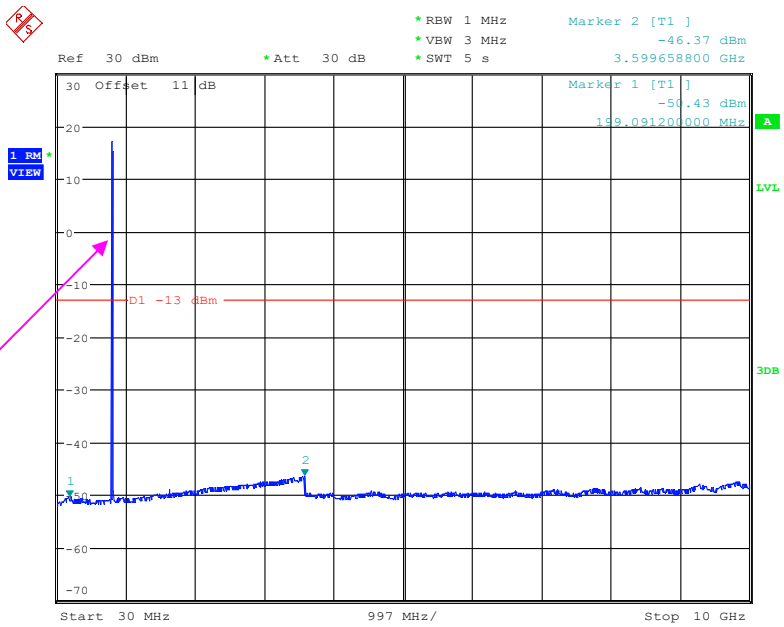
30 MHz – 10 GHz (GSM Mode)



Fundamental test

Date: 18.JUN.2022 00:26:44

30 MHz – 10 GHz (WCDMA Mode)

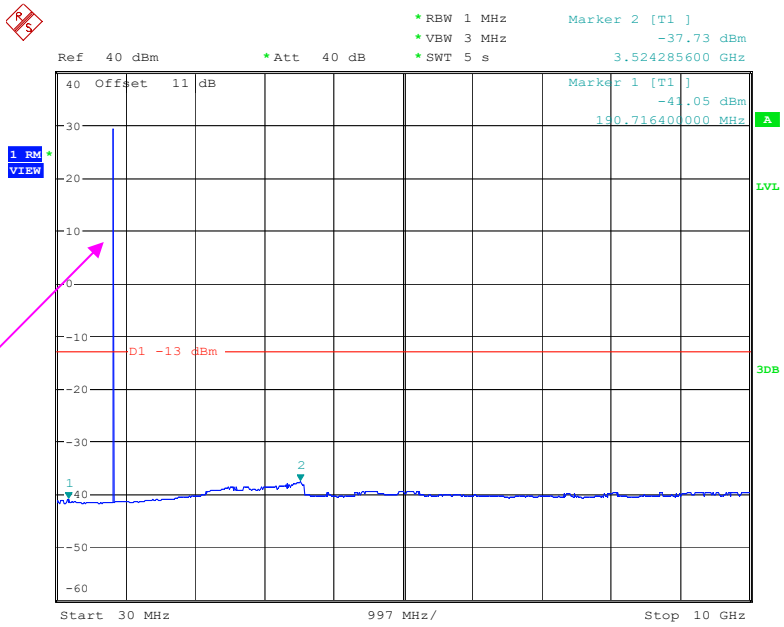


Fundamental test

Date: 19.JUN.2022 14:05:44

Middle Channel:

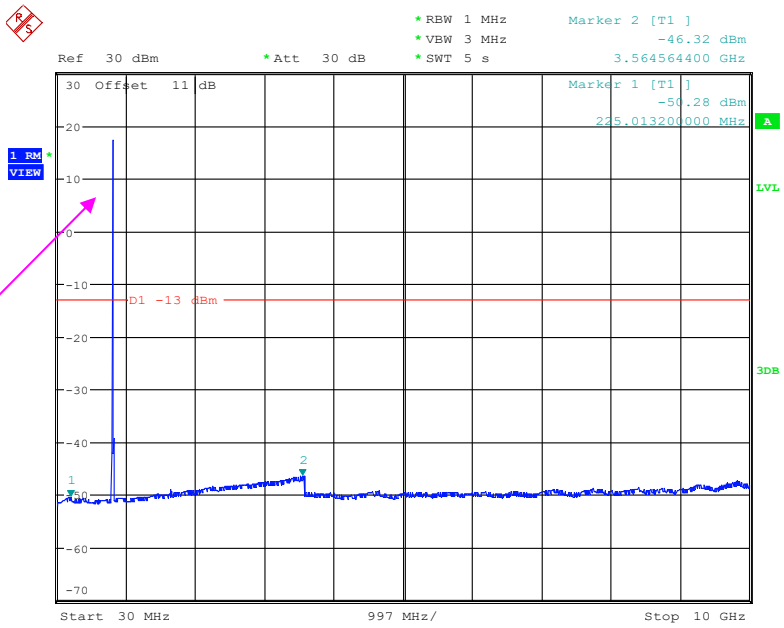
30 MHz – 10 GHz (GSM Mode)



Fundamental test

Date: 18.JUN.2022 00:31:49

30 MHz – 10 GHz (WCDMA Mode)

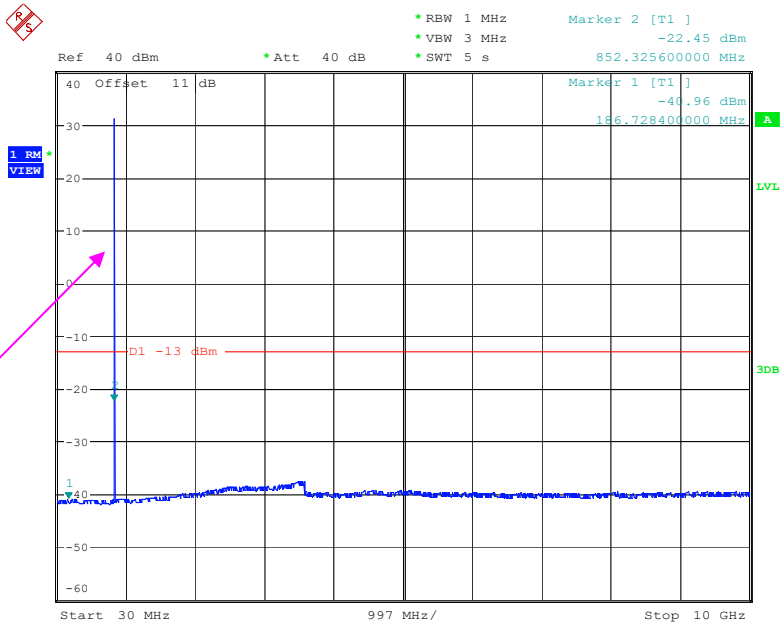


Fundamental test

Date: 19.JUN.2022 14:15:56

High Channel:

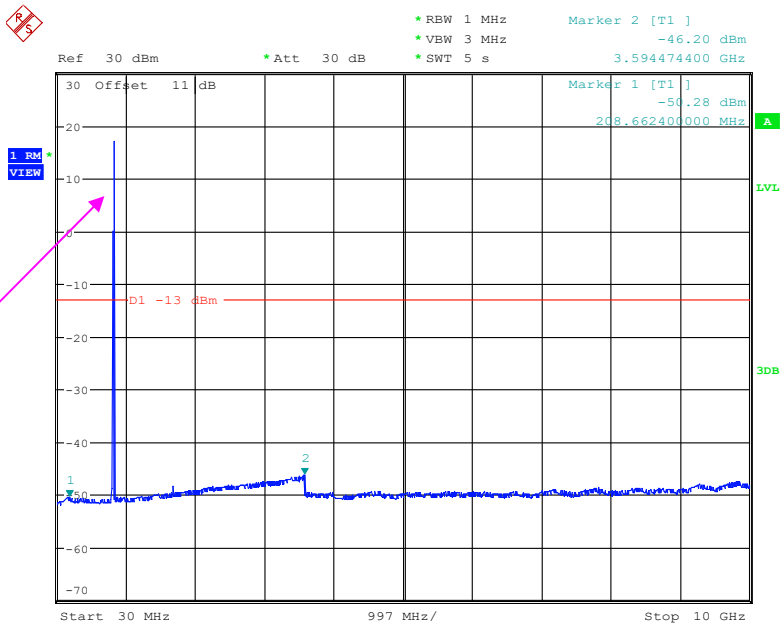
30 MHz – 10 GHz (GSM Mode)



Fundamental test

Date: 18.JUN.2022 00:05:06

30 MHz – 10 GHz (WCDMA Mode)

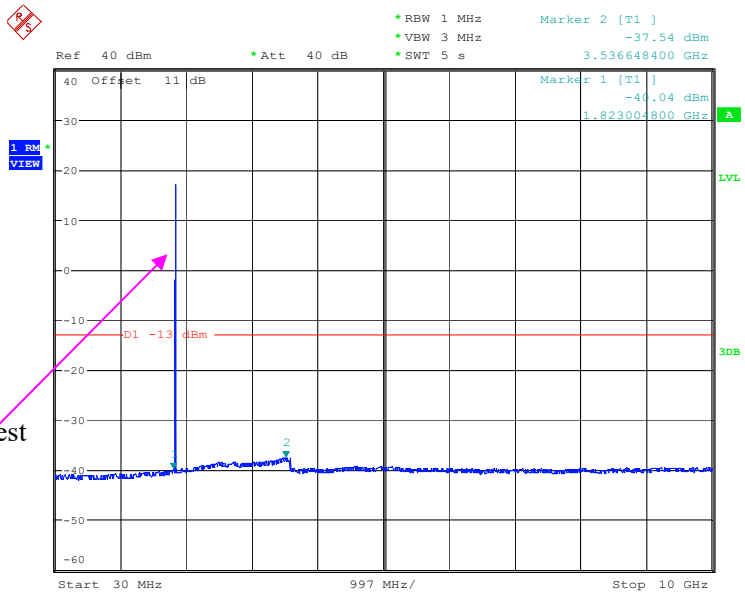


Fundamental test

Date: 19.JUN.2022 14:26:45

PCS Band (Part 24E)
Low Channel:

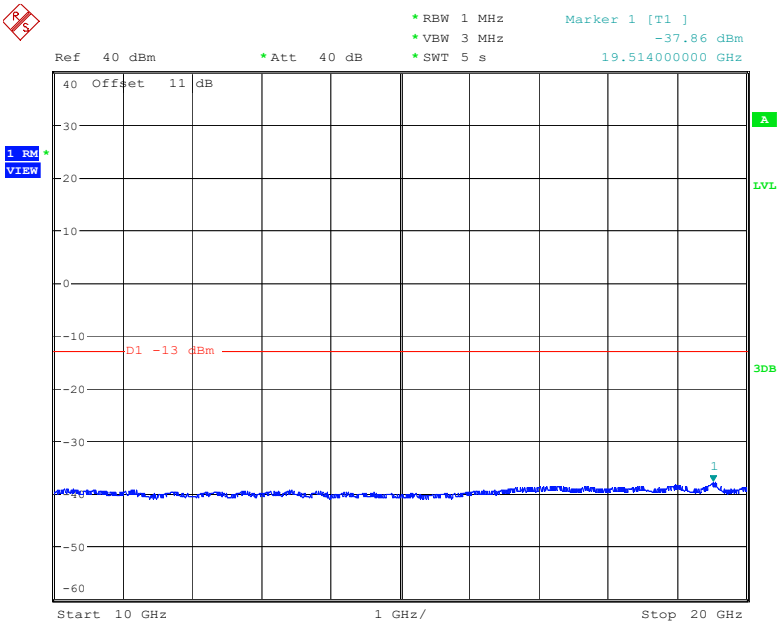
30 MHz – 10 GHz (GSM Mode)



Fundamental test

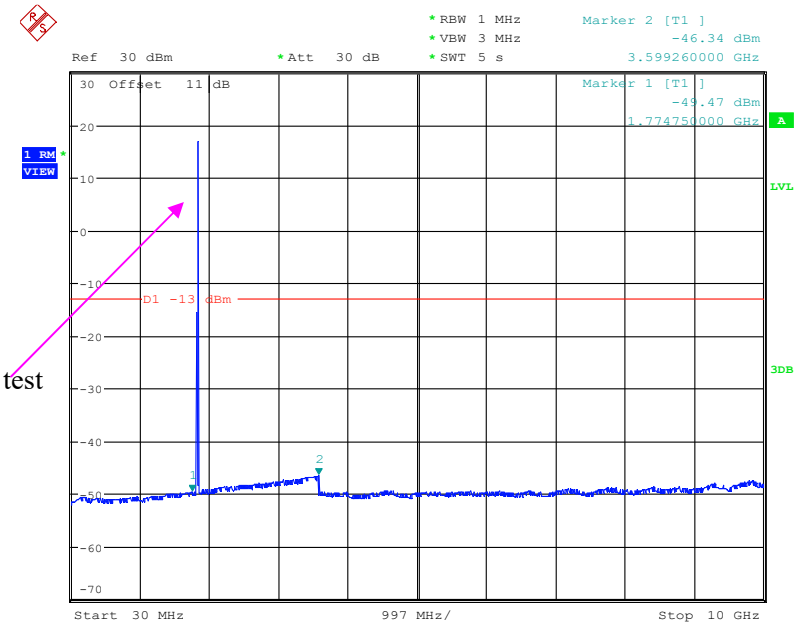
Date: 18.JUN.2022 00:42:03

10 GHz – 20 GHz (GSM Mode)



Date: 18.JUN.2022 00:42:39

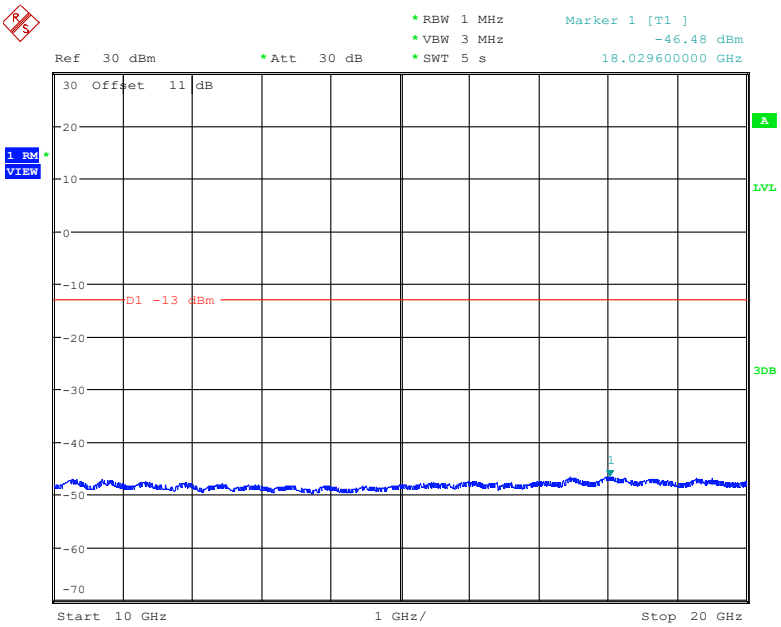
30 MHz – 10 GHz (WCDMA Mode)



Fundamental test

Date: 19.JUN.2022 13:34:20

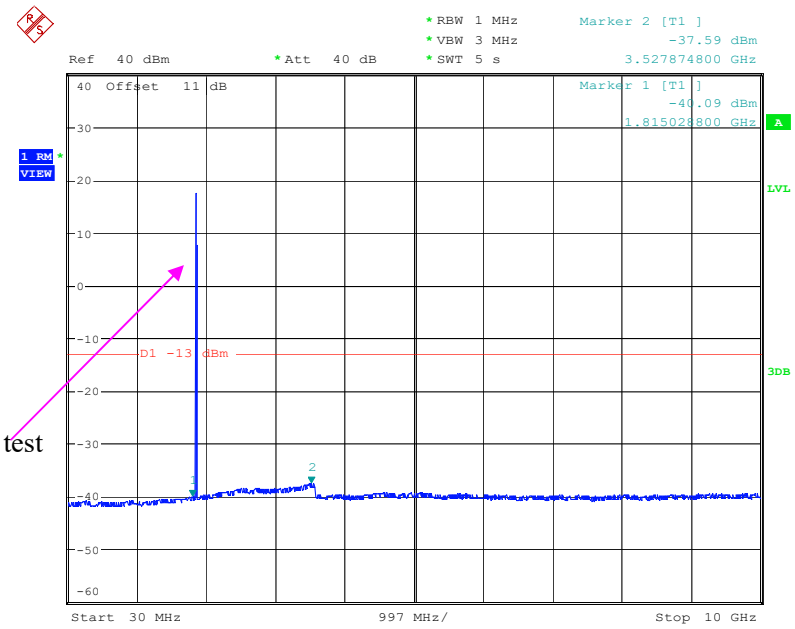
10 GHz – 20 GHz (WCDMA Mode)



Date: 19.JUN.2022 13:34:56

Middle Channel:

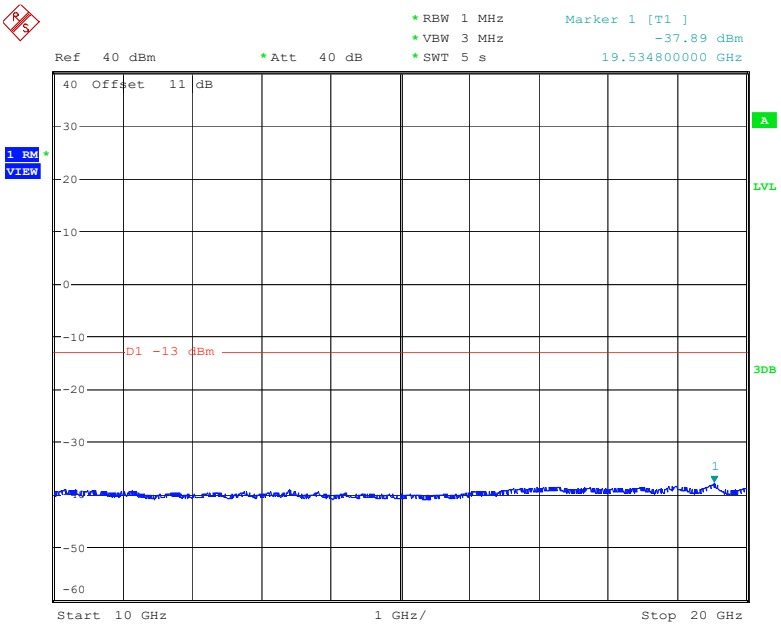
30 MHz – 10 GHz (GSM Mode)



Fundamental test

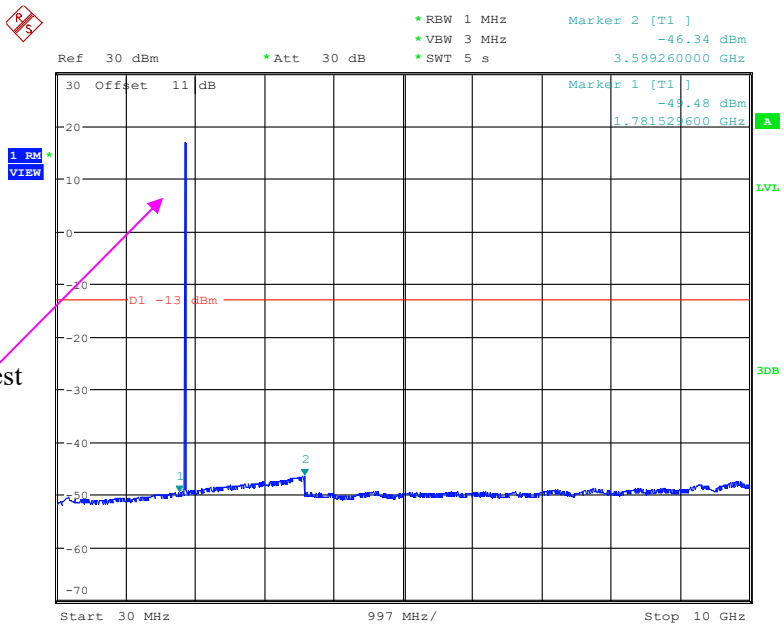
Date: 18.JUN.2022 00:44:39

10 GHz – 20 GHz (GSM Mode)



Date: 18.JUN.2022 00:45:16

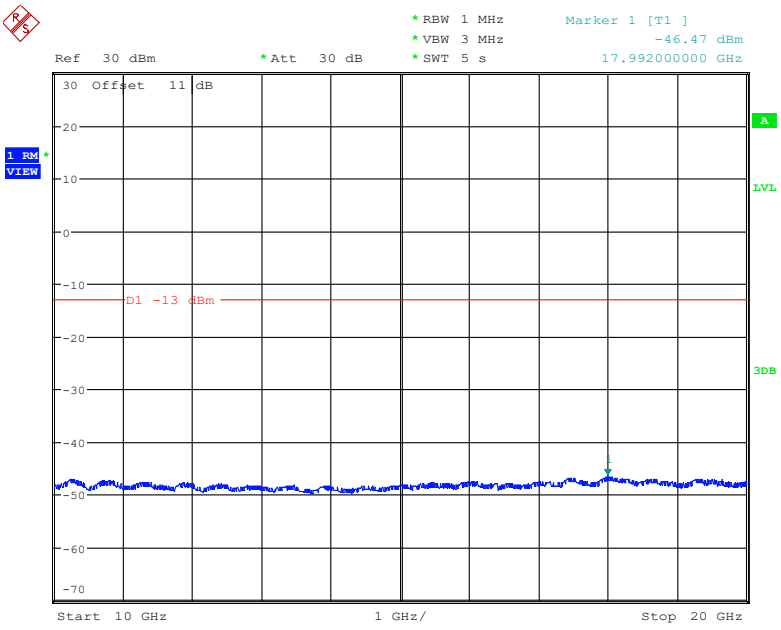
30 MHz – 10 GHz (WCDMA Mode)



Fundamental test

Date: 19.JUN.2022 13:37:20

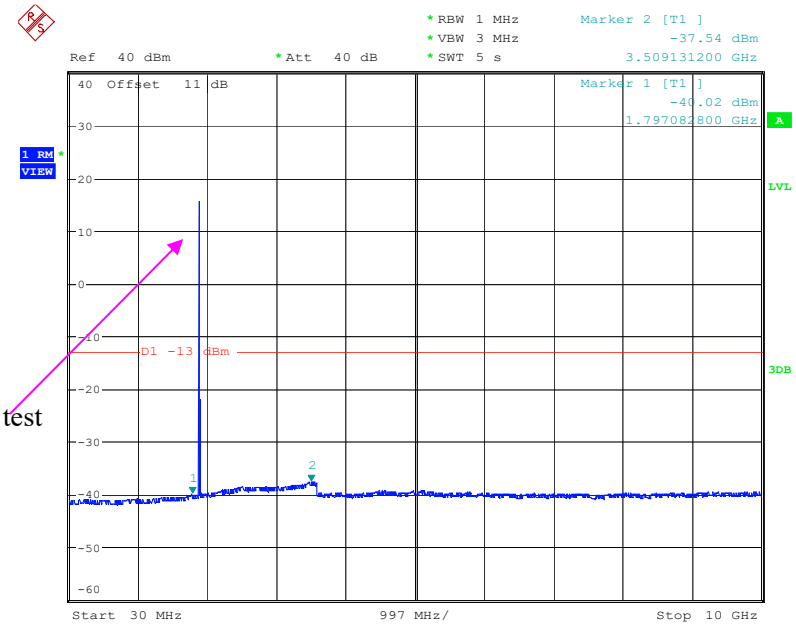
10 GHz – 20GHz (WCDMA Mode)



Date: 19.JUN.2022 13:37:56

High Channel:

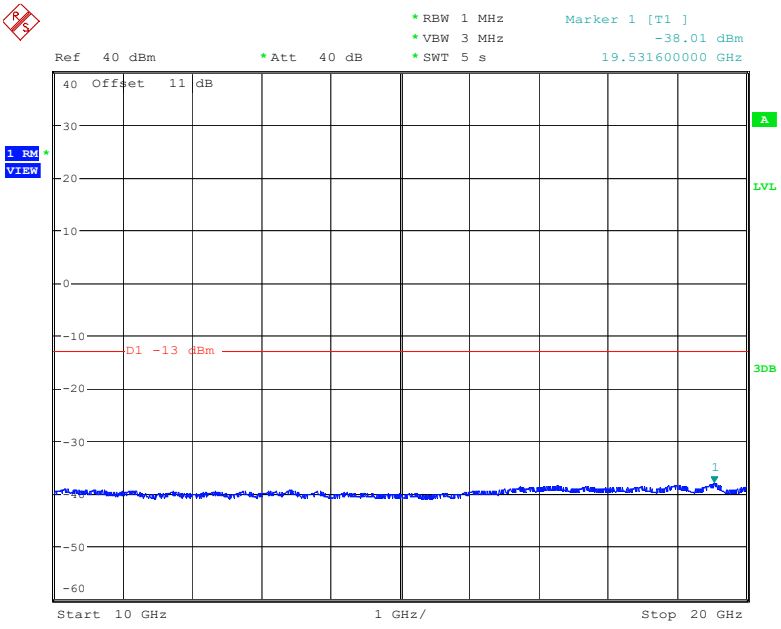
30 MHz – 10 GHz (GSM Mode)



Fundamental test

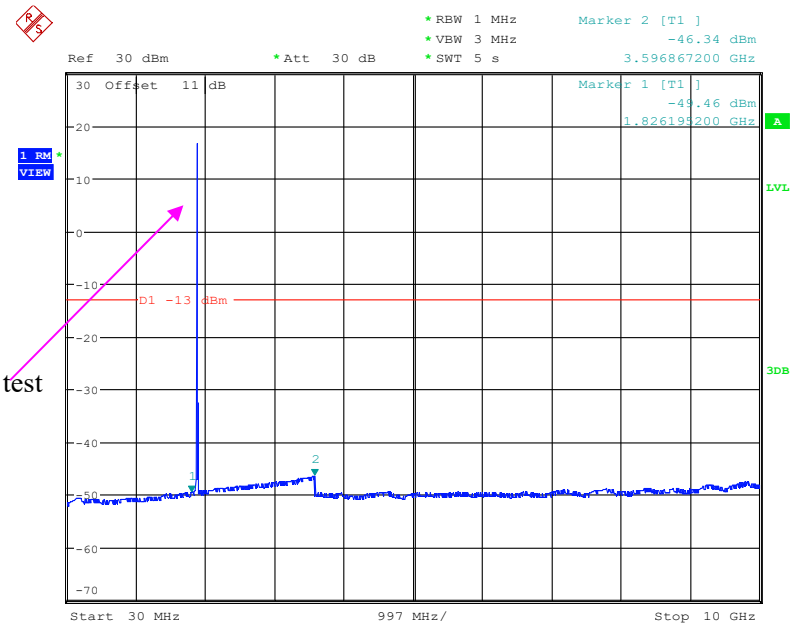
Date: 18.JUN.2022 00:47:52

10 GHz – 20 GHz (GSM Mode)



Date: 18.JUN.2022 00:48:28

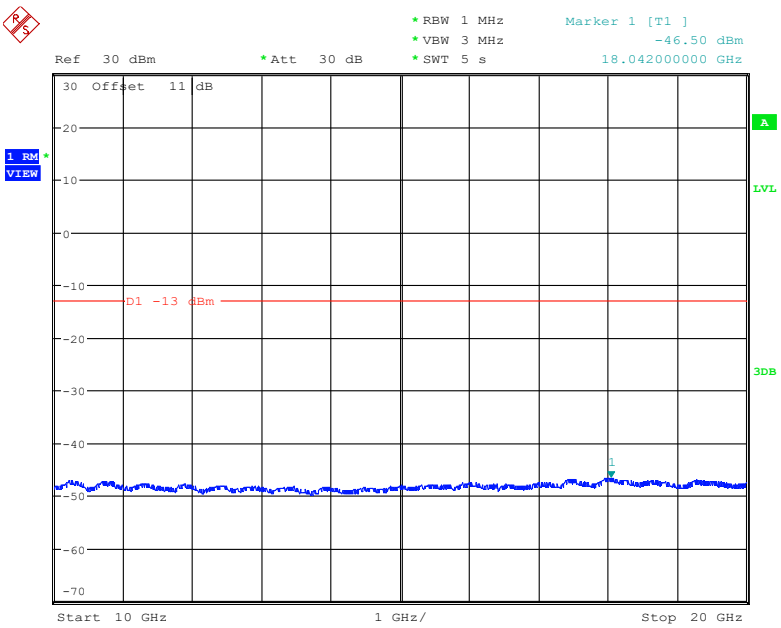
30 MHz – 10 GHz (WCDMA Mode)



Fundamental test

Date: 19.JUN.2022 13:41:11

10 GHz – 20 GHz (WCDMA Mode)



Date: 19.JUN.2022 13:41:47

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

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:	26.3 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Jeff Jiang from 2022-06-10 to 2022-06-11.

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

The worst case is as below:

30MHz-10GHz:

Cellular Band (Part 22H)

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								
Low Channel								
955.94	-70.49	79	2.1	H	10.0	-60.49	-13	47.49
955.94	-77.57	296	2.4	V	11.7	-65.87	-13	52.87
1648.4	-60.6	151	1.8	H	3.5	-57.1	-13	44.1
1648.4	-60.4	211	2.1	V	3.1	-57.3	-13	44.3
Middle Channel								
952.85	-70.18	227	1.1	H	10.0	-60.18	-13	47.18
952.85	-75.17	344	2.5	V	11.7	-63.47	-13	50.47
1672.8	-59.1	302	1.7	H	3.8	-55.3	-13	42.3
1672.8	-59.0	214	1.4	V	3.1	-55.9	-13	42.9
High Channel								
952.11	-72.42	204	2.2	H	10.0	-62.42	-13	49.42
952.11	-75.51	211	1.3	V	11.7	-63.81	-13	50.81
1697.6	-58.7	131	1.7	H	4.1	-54.6	-13	41.6
1697.6	-57.8	272	1.2	V	3.1	-54.7	-13	41.7

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								
Low Channel								
953.64	-71.91	90	1.1	H	10.0	-61.91	-13	48.91
953.64	-75.66	128	1.2	V	11.7	-63.96	-13	50.96
1652.8	-59.7	191	1.3	H	3.5	-56.2	-13	43.2
1652.8	-58.6	265	1.6	V	3.1	-55.5	-13	42.5
Middle Channel								
951.81	-70.52	44	2.4	H	10.0	-60.52	-13	47.52
951.81	-75.12	336	1.1	V	11.7	-63.42	-13	50.42
1672.8	-60.0	329	1.1	H	3.5	-56.5	-13	43.5
1672.8	-57.7	155	2.0	V	3.1	-54.6	-13	41.6
High Channel								
956.85	-71.06	72	2.2	H	10.0	-61.06	-13	48.06
956.85	-75.60	108	1.6	V	11.7	-63.90	-13	50.90
1693.2	-59.6	38	1.8	H	4.1	-55.5	-13	42.5
1693.2	-58.3	240	1.5	V	3.1	-55.2	-13	42.2

30MHz-20GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM 1900								
Low Channel								
952.19	-70.32	245	1.3	H	10.0	-60.32	-13	47.32
952.19	-77.07	283	2.2	V	11.7	-65.37	-13	52.37
3700.4	-56.4	344	1.7	H	8.1	-48.3	-13	35.3
3700.4	-55.5	246	2.4	V	7.6	-47.9	-13	34.9
Middle Channel								
953.56	-72.19	60	2.0	H	10.0	-62.19	-13	49.19
953.56	-76.20	353	1.6	V	11.7	-64.50	-13	51.50
3760	-57.8	230	1.7	H	8.8	-49	-13	36.0
3760	-56.7	167	2.2	V	8	-48.7	-13	35.7
High Channel								
952.48	-72.18	156	1.2	H	10.0	-62.18	-13	49.18
952.48	-76.97	170	1.6	V	11.7	-65.27	-13	52.27
3819.6	-57.1	1	1.8	H	8.7	-48.4	-13	35.4
3819.6	-56.3	29	2.1	V	8	-48.3	-13	35.3

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								
Low Channel								
953.49	-70.31	294	1.2	H	10.0	-60.31	-13	47.31
953.49	-75.20	192	2.1	V	11.7	-63.50	-13	50.50
3704.8	-56.1	302	1.1	H	8.1	-48	-13	35.0
3704.8	-55.3	257	2.4	V	7.6	-47.7	-13	34.7
Middle Channel								
950.97	-72.03	10	2.5	H	10.0	-62.03	-13	49.03
950.97	-76.70	281	1.9	V	11.7	-65.00	-13	52.00
3760	-58.3	243	2.0	H	8.8	-49.5	-13	36.5
3760	-56.1	281	1.3	V	8	-48.1	-13	35.1
High Channel								
956.05	-71.98	264	1.5	H	10.0	-61.98	-13	48.98
956.05	-76.25	103	2.3	V	11.7	-64.55	-13	51.55
3815.2	-57.3	204	1.1	H	8.7	-48.6	-13	35.6
3815.2	-55.3	329	1.2	V	8	-47.3	-13	34.3

LTE Band: *(Pre-scan with all the bandwidth and modulation, and 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)				
Band 2								
Test frequency range: 30MHz-20GHz								
QPSK, 1.4MHz bandwidth, Low Channel								
952.29	-70.57	52	2.1	H	10.0	-60.57	-13	47.57
952.29	-76.58	279	2.2	V	11.7	-64.88	-13	51.88
3701.4	-57.2	106	1.4	H	8.1	-49.1	-13	36.1
3701.4	-55.8	227	1.4	V	7.6	-48.2	-13	35.2
QPSK, 1.4MHz bandwidth, Middle Channel								
954.82	-70.70	128	1.1	H	10.0	-60.70	-13	47.70
954.82	-77.31	304	2.3	V	11.7	-65.61	-13	52.61
3760	-58.2	222	2.0	H	8.8	-49.4	-13	36.4
3760	-56.4	107	2.2	V	8	-48.4	-13	35.4
QPSK, 1.4MHz bandwidth, High Channel								
954.61	-70.41	155	1.4	H	10.0	-60.41	-13	47.41
954.61	-76.03	64	1.8	V	11.7	-64.33	-13	51.33
3818.6	-57.3	140	2.4	H	8.7	-48.6	-13	35.6
3818.6	-56.5	65	2.0	V	8	-48.5	-13	35.5

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Band 4								
Test frequency range: 30MHz-20GHz								
QPSK, 1.4MHz bandwidth, Low Channel								
956.10	-72.84	173	2.2	H	10.0	-62.84	-13	49.84
956.10	-76.16	212	1.6	V	11.7	-64.46	-13	51.46
3421.4	-53.3	230	1.2	H	6.4	-46.9	-13	33.9
3421.4	-51.9	288	1.9	V	5.7	-46.2	-13	33.2
QPSK, 1.4MHz bandwidth, Middle Channel								
952.35	-71.55	287	2.0	H	10.0	-61.55	-13	48.55
952.35	-75.97	122	1.6	V	11.7	-64.27	-13	51.27
3465	-53.5	170	1.2	H	7	-46.5	-13	33.5
3465	-52.0	52	1.2	V	6.2	-45.8	-13	32.8
QPSK, 1.4MHz bandwidth, High Channel								
956.82	-72.05	309	1.4	H	10.0	-62.05	-13	49.05
956.82	-75.07	295	1.9	V	11.7	-63.37	-13	50.37
3508.6	-54.5	104	1.0	H	7.8	-46.7	-13	33.7
3508.6	-53.9	14	2.2	V	6.6	-47.3	-13	34.3

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Band 7								
Test frequency range: 30MHz-26.5GHz								
QPSK, 5MHz bandwidth, Low Channel								
950.63	-71.21	98	1.7	H	10.0	-61.21	-25	36.21
950.63	-77.70	263	1.7	V	11.7	-66.00	-25	41.00
5005	-56.6	289	1.7	H	10.8	-45.8	-25	20.8
5005	-55.7	49	1.7	V	10.2	-45.5	-25	20.5
QPSK, 5MHz bandwidth, Middle Channel								
951.02	-70.68	231	1.9	H	9.8	-60.88	-25	35.88
951.02	-75.10	151	2.1	V	11.7	-63.40	-25	38.40
5070	-56.1	346	1.8	H	11.1	-45	-25	20.0
5070	-56.6	252	2.0	V	10.8	-45.8	-25	20.8
QPSK, 5MHz bandwidth, High Channel								
954.30	-70.46	31	1.1	H	10.0	-60.46	-25	35.46
954.30	-75.39	82	1.3	V	11.7	-63.69	-25	38.69
5135	-56.4	256	1.7	H	11.3	-45.1	-25	20.1
5135	-56.4	178	2.4	V	10.8	-45.6	-25	20.6

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Band 12								
Test frequency range: 30MHz-10GHz								
QPSK, 1.4MHz bandwidth, Low Channel								
954.80	-62.62	192	1.9	H	-0.2	-62.82	-13	48.51
954.80	-68.38	108	2.1	V	3.1	-65.28	-13	50.06
1399.4	-63.3	116	1.1	H	5.9	-57.4	-13	44.4
1399.4	-63.6	200	2.0	V	5.9	-57.7	-13	44.7
2099.1	-39.6	33	1.5	H	6.3	-33.3	-13	20.3
2099.1	-39.6	112	1.7	V	5.1	-34.5	-13	21.5
QPSK, 1.4MHz bandwidth, Middle Channel								
951.19	-60.96	252	1.5	H	-0.2	-61.16	-13	49.77
951.19	-70.85	272	1.8	V	3.1	-67.75	-13	52.56
1415	-63.2	210	2.1	H	5.7	-57.5	-13	44.5
1415	-63.0	124	2.2	V	5.4	-57.6	-13	44.6
2122.5	-38.6	66	2.1	H	6.7	-31.9	-13	18.9
2122.5	-36.5	322	2.4	V	5.8	-30.7	-13	17.7
QPSK, 1.4MHz bandwidth, High Channel								
956.44	-62.98	82	1.8	H	-0.2	-63.18	-13	48.85
956.44	-68.52	283	1.8	V	3.1	-65.42	-13	51.84
1430.6	-62.7	103	1.1	H	5.4	-57.3	-13	44.3
1430.6	-63.4	11	1.7	V	4.8	-58.6	-13	45.6
2145.9	-44.6	352	2.2	H	7	-37.6	-13	24.6
2145.9	-43.1	89	2.1	V	6.6	-36.5	-13	23.5

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Band 17								
Test frequency range: 30MHz-8GHz								
QPSK, 5MHz bandwidth, Low Channel								
953.11	-71.07	221	2.4	H	10.0	-61.07	-13	48.07
953.11	-77.50	223	1.0	V	11.7	-65.80	-13	52.80
1413	-63.0	15	1.9	H	5.7	-57.3	-13	44.3
1413	-62.3	234	2.4	V	5.4	-56.9	-13	43.9
QPSK, 5MHz bandwidth, Middle Channel								
955.89	-71.47	183	1.8	H	10.0	-61.47	-13	48.47
955.89	-75.07	325	1.8	V	11.7	-63.37	-13	50.37
1420	-63.1	148	2.1	H	5.6	-57.5	-13	44.5
1420	-63.0	352	1.6	V	5.2	-57.8	-13	44.8
QPSK, 5MHz bandwidth, High Channel								
954.15	-70.05	250	2.5	H	10.0	-60.05	-13	47.05
954.15	-76.58	328	2.3	V	11.7	-64.88	-13	51.88
1427	-63.1	322	1.2	H	5.5	-57.6	-13	44.6
1427	-62.1	173	1.6	V	4.9	-57.2	-13	44.2

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 (g)(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.

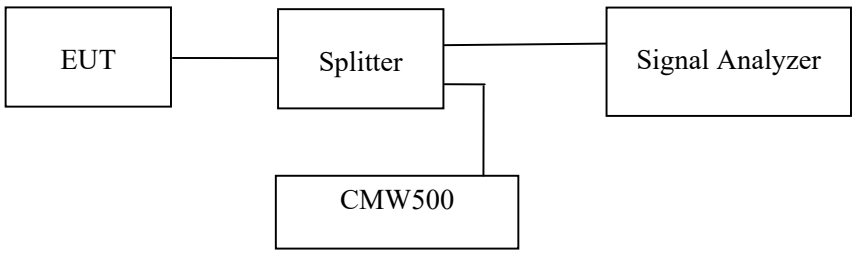
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC §27.53 (g)(h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Test Procedure

The 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:	28.1~28.3 ℃
Relative Humidity:	56~57 %
ATM Pressure:	101.0 kPa

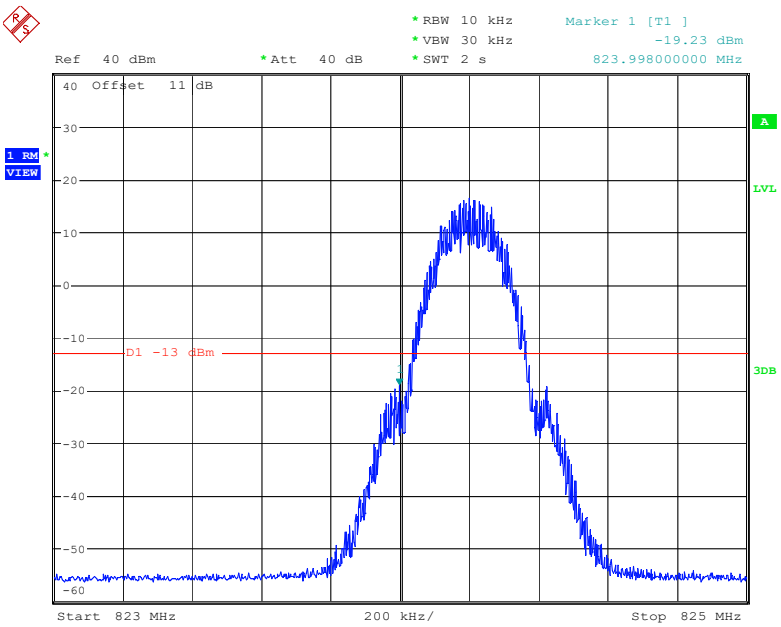
The testing was performed by Roger Ling from 2022-06-17 to 2022-06-19.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

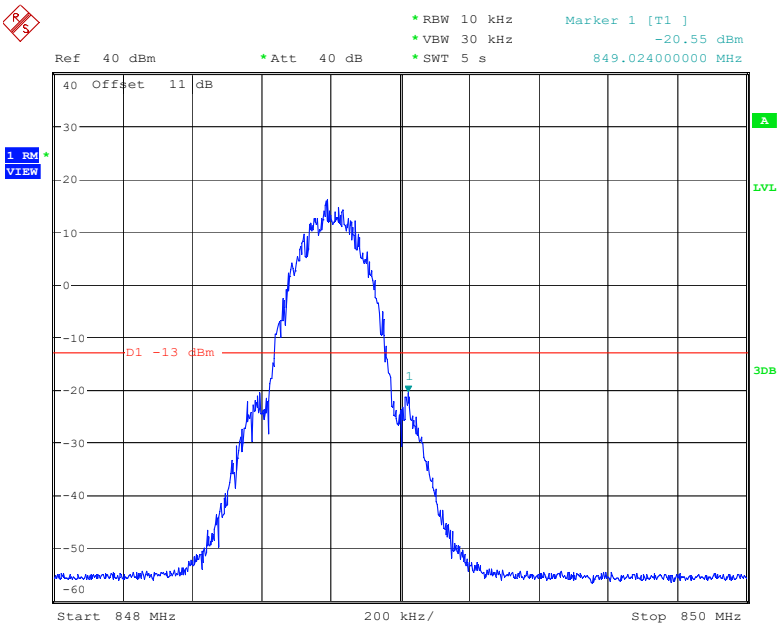
Please refer to the following plots.

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



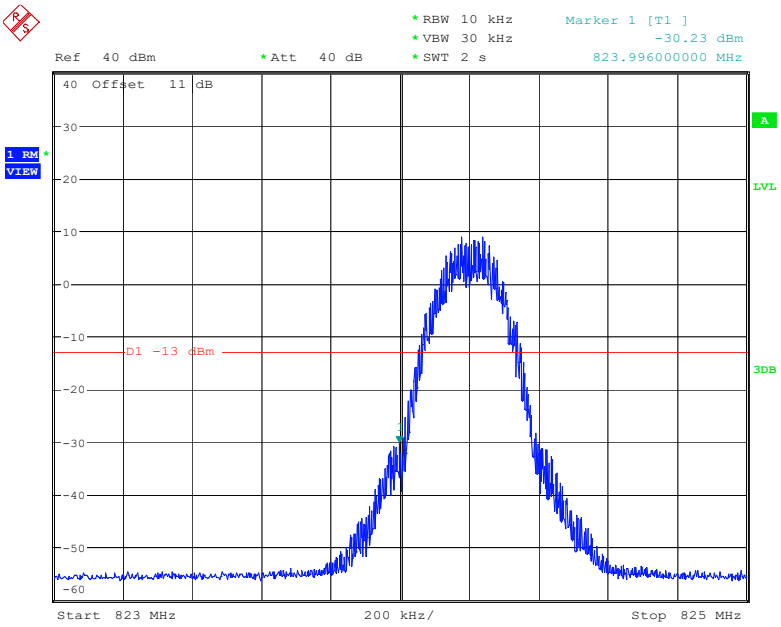
Date: 17.JUN.2022 23:51:21

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



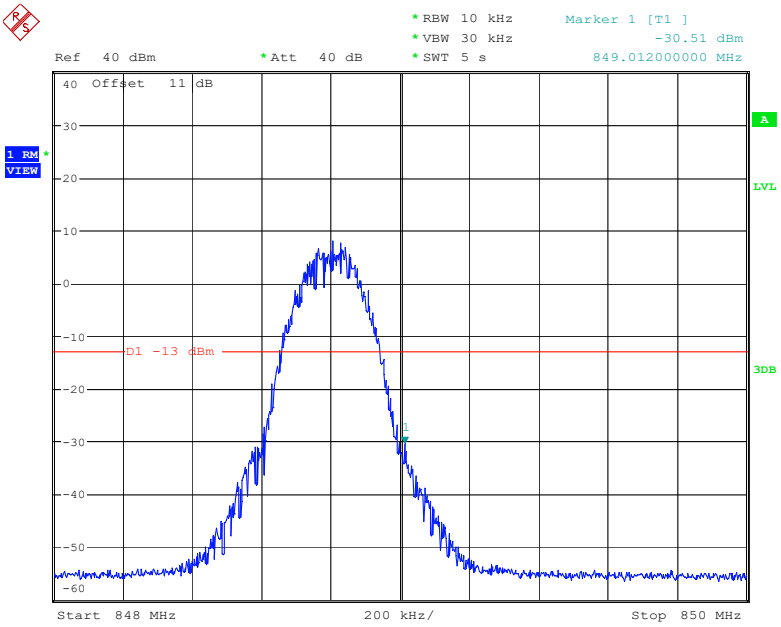
Date: 18.JUN.2022 00:04:29

Cellular Band, Left Band Edge for EGPRS (8PSK) Mode



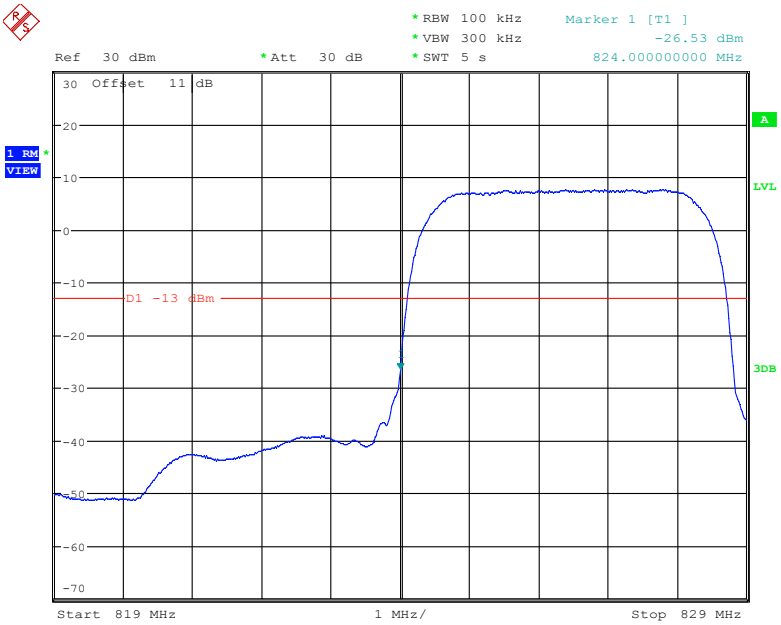
Date: 18.JUN.2022 00:11:15

Cellular Band, Right Band Edge for EGPRS (8PSK) Mode



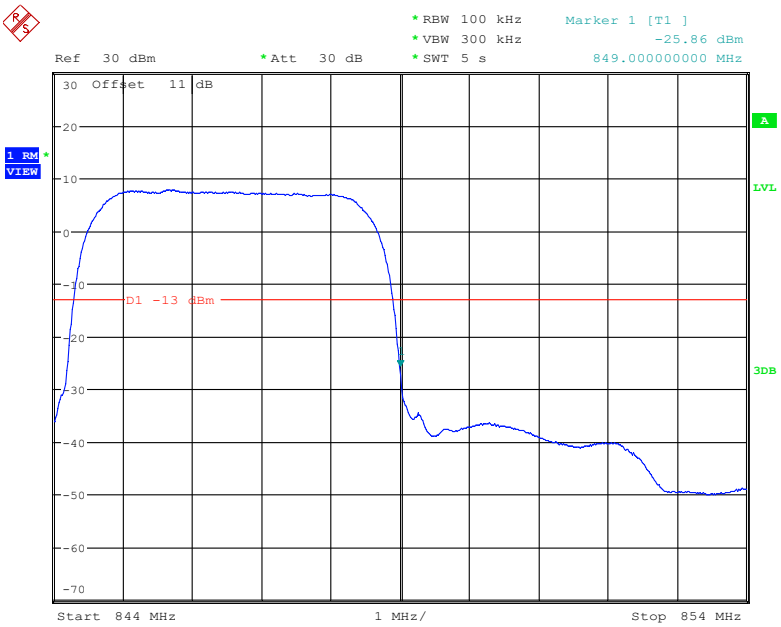
Date: 18.JUN.2022 00:15:55

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



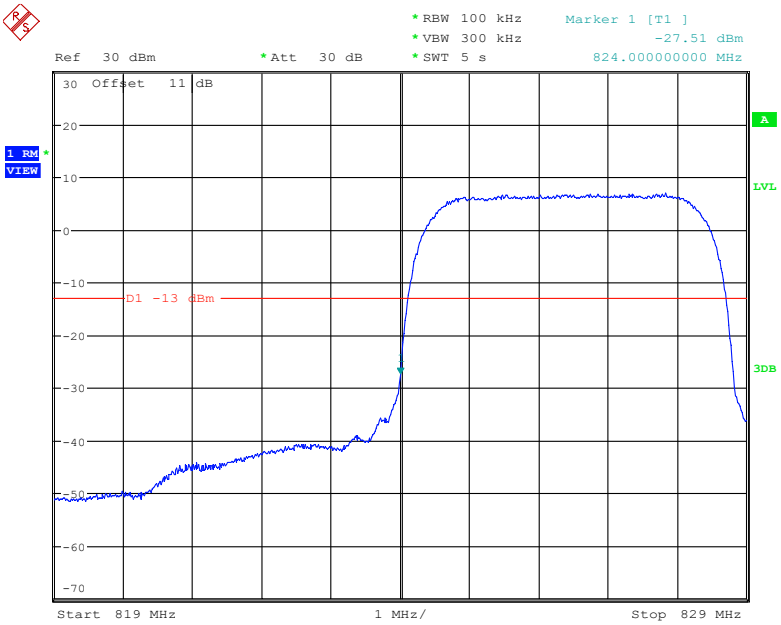
Date: 19.JUN.2022 14:51:39

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



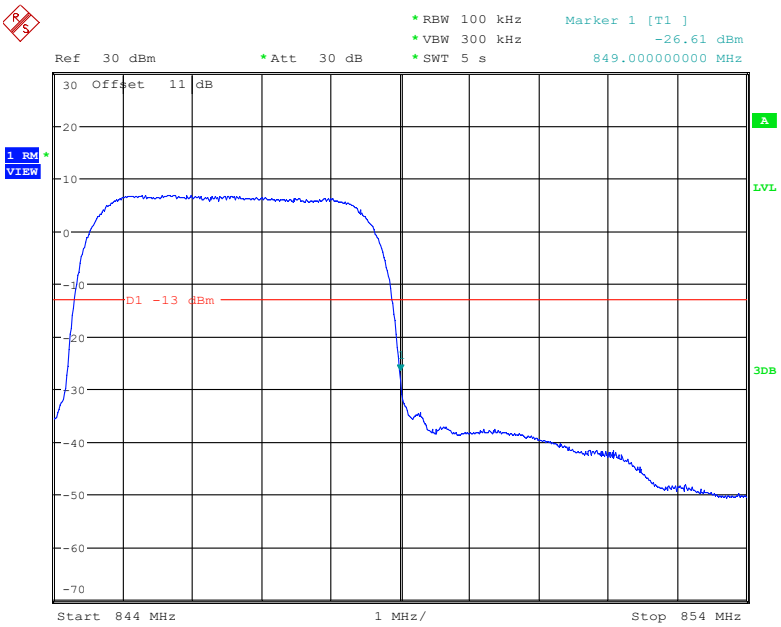
Date: 19.JUN.2022 14:26:08

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



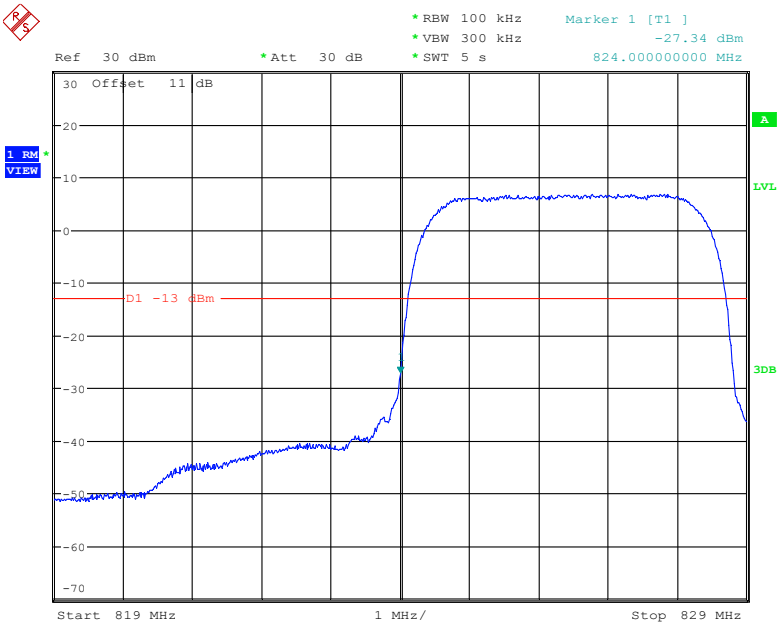
Date: 19.JUN.2022 14:53:08

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



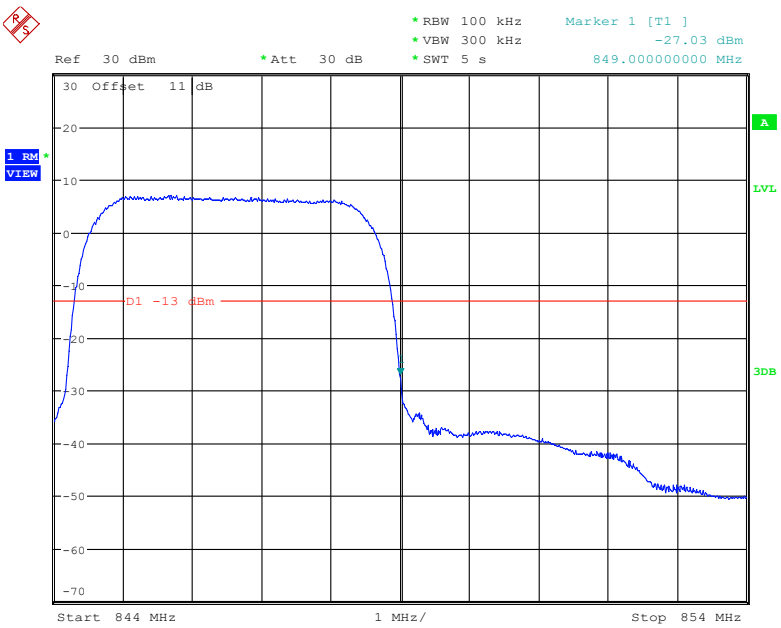
Date: 19.JUN.2022 14:33:57

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



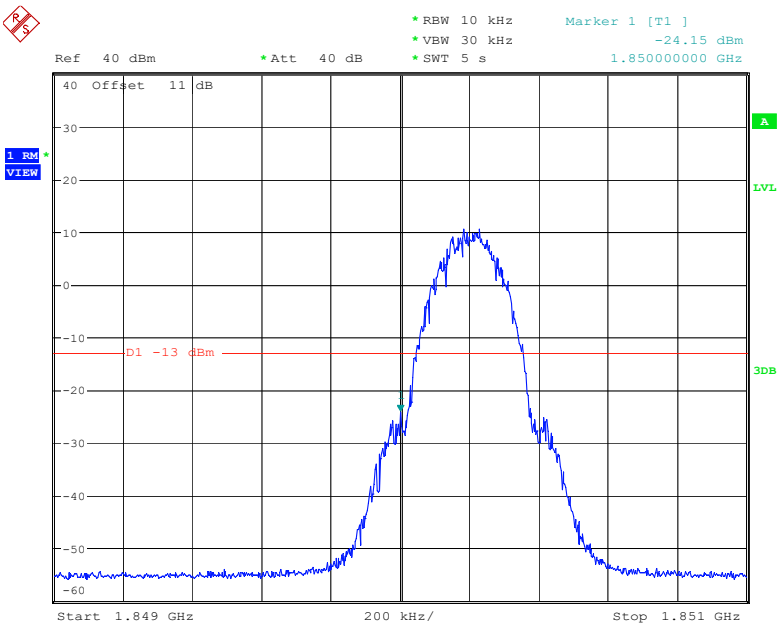
Date: 19.JUN.2022 14:52:30

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



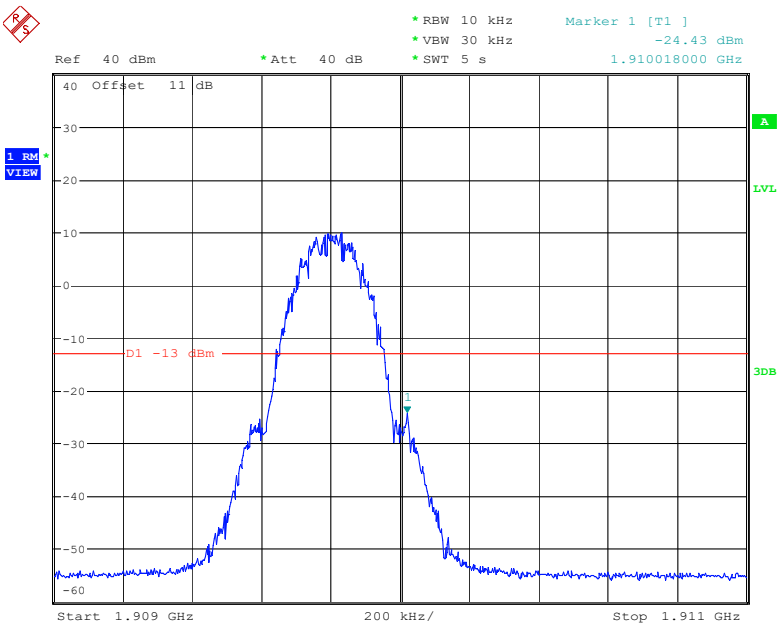
Date: 19.JUN.2022 14:30:11

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



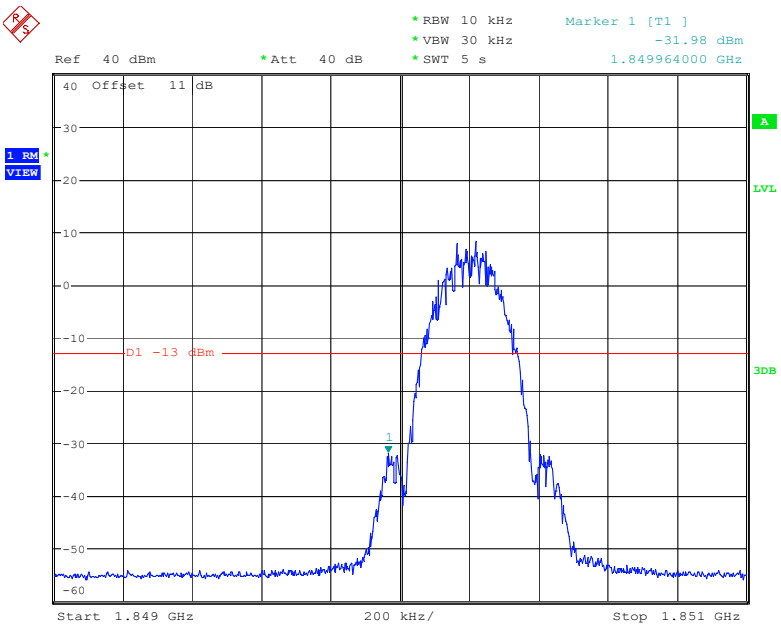
Date: 18.JUN.2022 00:41:26

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



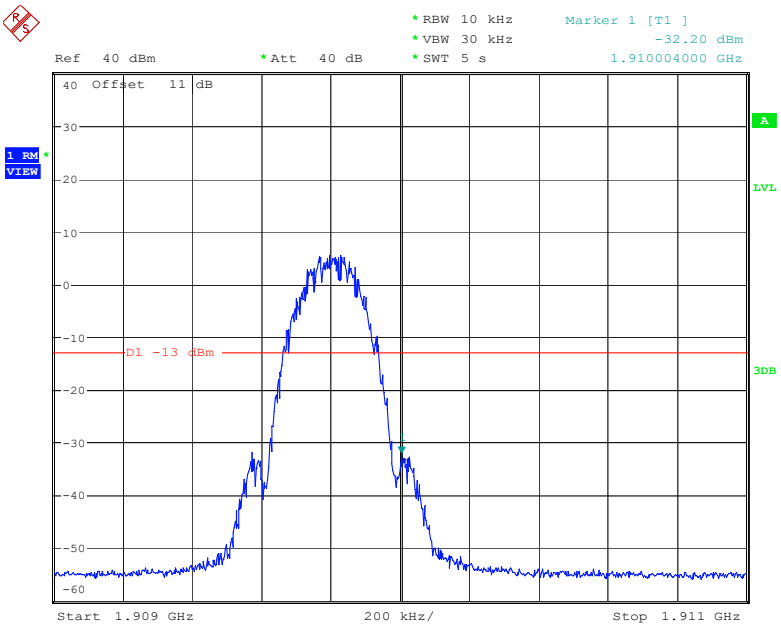
Date: 18.JUN.2022 00:47:15

PCS Band, Left Band Edge for EGPRS (8PSK) Mode



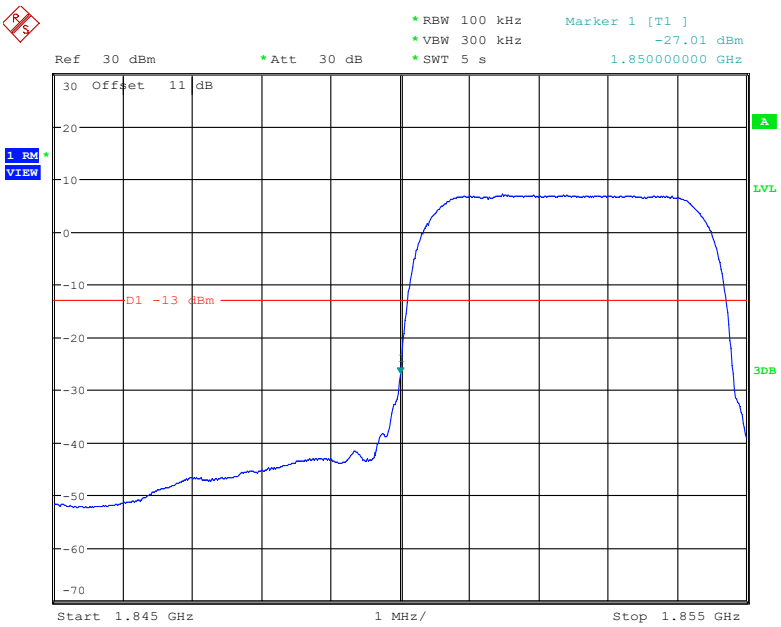
Date: 18.JUN.2022 00:53:07

PCS Band, Right Band Edge for EGPRS (8PSK) Mode



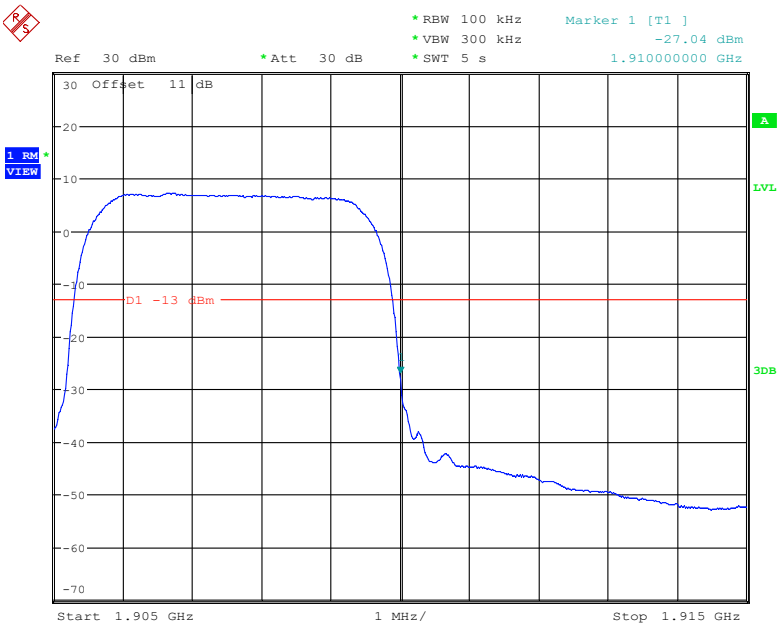
Date: 18.JUN.2022 00:56:44

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



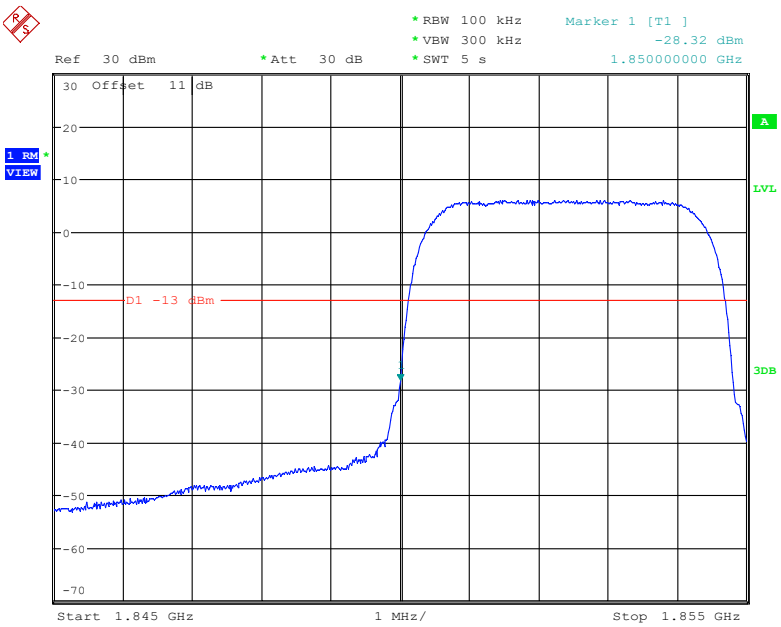
Date: 19.JUN.2022 13:33:43

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



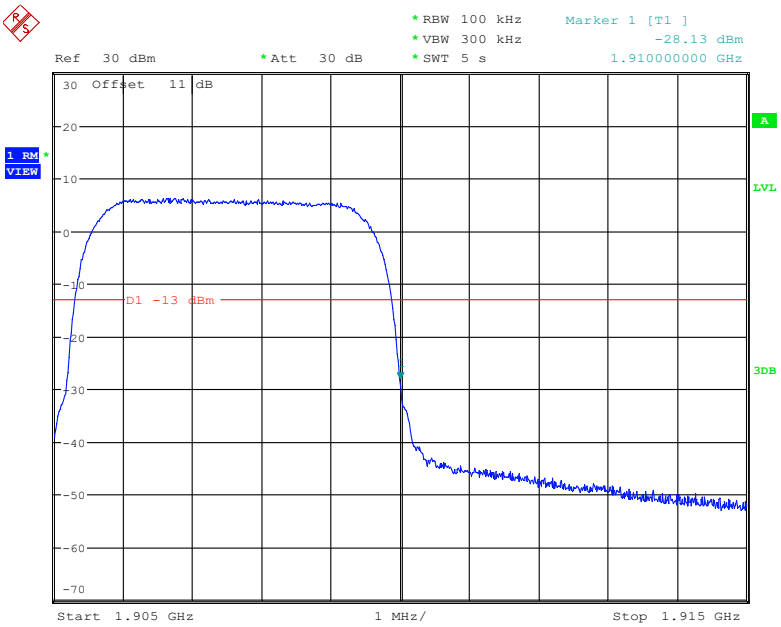
Date: 19.JUN.2022 13:40:33

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



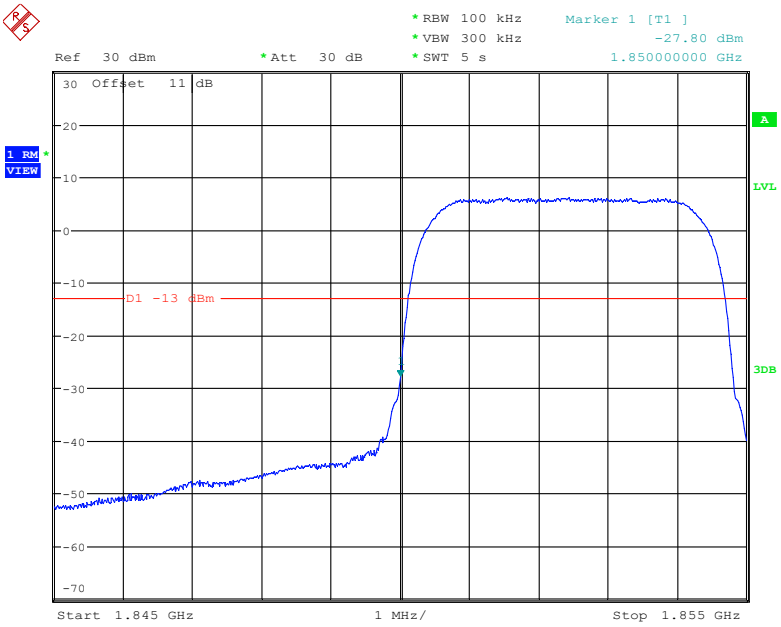
Date: 19.JUN.2022 13:56:57

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



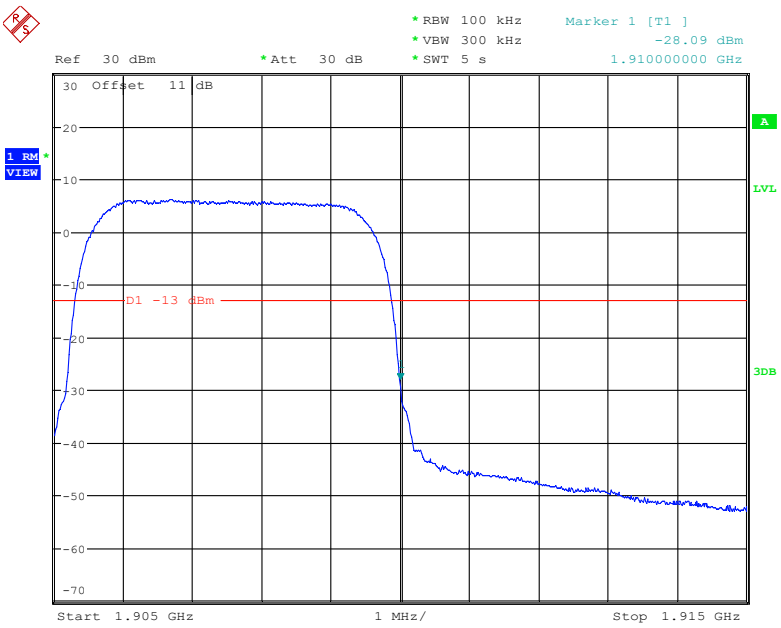
Date: 19.JUN.2022 13:51:49

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



Date: 19.JUN.2022 14:01:44

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



Date: 19.JUN.2022 13:49:01

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

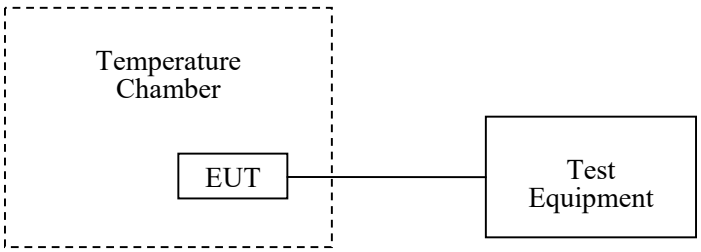
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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:	28.1~28.3 ℃
Relative Humidity:	56~57 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2022-06-17 to 2022-06-19.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.4MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	N.V.	-2	-0.0024	2.5
-20		3	0.0036	2.5
-10		8	0.0096	2.5
0		7	0.0084	2.5
10		4	0.0048	2.5
20		5	0.0060	2.5
30		4	0.0048	2.5
40		7	0.0084	2.5
50		9	0.0108	2.5
20	L.V.	5	0.0060	2.5
	H.V.	-2	-0.0024	2.5

EDGE Mode

Middle Channel, f_o =836.4MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	N.V.	2	0.0024	2.5
-20		-6	-0.0072	2.5
-10		-3	-0.0036	2.5
0		-5	-0.0060	2.5
10		-11	-0.0131	2.5
20		-10	-0.0120	2.5
30		-7	-0.0084	2.5
40		-5	-0.0060	2.5
50		-9	-0.0108	2.5
20	L.V.	-6	-0.0072	2.5
	H.V.	-3	-0.0036	2.5

WCDMA Mode

Middle Channel, f_o =836.4MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	N.V.	-3	-0.0036	2.5
-20		5	0.0060	2.5
-10		-1	-0.0012	2.5
0		-4	-0.0048	2.5
10		-3	-0.0036	2.5
20		2	0.0024	2.5
30		4	0.0048	2.5
40		-3	-0.0036	2.5
50		-2	-0.0024	2.5
20	L.V.	3	0.0036	2.5
	H.V.	4	0.0048	2.5

PCS Band (Part 24E)
GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	3	0.0016	pass
-20		-2	-0.0011	pass
-10		5	0.0027	pass
0		-3	-0.0016	pass
10		-1	-0.0005	pass
20		4	0.0021	pass
30		3	0.0016	pass
40		5	0.0027	pass
50		-2	-0.0011	pass
20	L.V.	4	0.0021	pass
	H.V.	1	0.0005	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-2	-0.0011	pass
-20		-4	-0.0021	pass
-10		-6	-0.0032	pass
0		-7	-0.0037	pass
10		-5	-0.0027	pass
20		-8	-0.0043	pass
30		-6	-0.0032	pass
40		-3	-0.0016	pass
50		2	0.0011	pass
20	L.V.	-4	-0.0021	pass
	H.V.	-7	-0.0037	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	2	0.0011	pass
-20		-4	-0.0021	pass
-10		3	0.0016	pass
0		-2	-0.0011	pass
10		4	0.0021	pass
20		5	0.0027	pass
30		3	0.0016	pass
40		7	0.0037	pass
50		9	0.0048	pass
20	L.V.	5	0.0027	pass
	H.V.	4	0.0021	pass

LTE: (worst case as below)
QPSK:
Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-16.98	-0.009	pass
-20		-9.97	-0.0053	pass
-10		-6.13	-0.0033	pass
0		6.17	0.0033	pass
10		7.92	0.0042	pass
20		6.46	0.0034	pass
30		-6.52	-0.0035	pass
40		7.18	0.0038	pass
50		-9.69	-0.0052	pass
20	L.V.	-8.17	-0.0043	pass
	H.V.	-7.05	-0.0038	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	1710.0663	1754.9184	1710	1755
-20		1710.1099	1754.8830	1710	1755
-10		1710.0375	1754.8704	1710	1755
0		1710.0415	1754.8949	1710	1755
10		1710.0146	1754.8563	1710	1755
20		1710.0571	1754.9495	1710	1755
30		1710.0201	1754.8943	1710	1755
40		1710.0243	1754.8887	1710	1755
50		1710.0509	1754.8570	1710	1755
20	L.V.	1710.0402	1754.9049	1710	1755
	H.V.	1710.0154	1754.9062	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	2500.0314	2569.8208	2500	2570
-20		2500.0734	2569.9316	2500	2570
-10		2500.0462	2569.8160	2500	2570
0		2500.0321	2569.9058	2500	2570
10		2500.1073	2569.9504	2500	2570
20		2500.0369	2569.8987	2500	2570
30		2500.0136	2569.8633	2500	2570
40		2500.1125	2569.9408	2500	2570
50		2500.1057	2569.8861	2500	2570
20	L.V.	2500.0890	2569.9090	2500	2570
	H.V.	2500.0803	2569.8595	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	699.0614	715.9450	699	716
-20		699.0386	715.9456	699	716
-10		699.0254	715.9759	699	716
0		699.0230	715.9485	699	716
10		699.0326	715.9656	699	716
20		699.0976	715.9391	699	716
30		699.0510	715.9747	699	716
40		699.0528	715.9805	699	716
50		699.0681	715.9600	699	716
20	L.V.	699.0478	715.9412	699	716
	H.V.	699.0909	715.9574	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	704.0041	715.9611	704	716
-20		704.0271	715.9596	704	716
-10		704.0121	715.9427	704	716
0		704.0693	715.9511	704	716
10		704.0639	715.9632	704	716
20		704.0506	715.9532	704	716
30		704.0694	715.9625	704	716
40		704.0557	715.9213	704	716
50		704.0258	715.9086	704	716
20	L.V.	704.0133	715.9687	704	716
	H.V.	704.0762	715.9454	704	716

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	N.V.	-5.64	-0.003	pass
-20		-6.68	-0.0036	pass
-10		9.77	0.0052	pass
0		-7.62	-0.0041	pass
10		-9.91	-0.0053	pass
20		-9.82	-0.0052	pass
30		-6.68	-0.0036	pass
40		-8.85	-0.0047	pass
50		5.67	0.003	pass
20	L.V.	6.05	0.0032	pass
	H.V.	7.52	0.004	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	1710.0779	1754.9402	1710	1755
-20		1710.0909	1754.8669	1710	1755
-10		1710.0999	1754.8857	1710	1755
0		1710.0534	1754.9012	1710	1755
10		1710.0146	1754.8563	1710	1755
20		1710.0752	1754.9424	1710	1755
30		1710.0183	1754.8724	1710	1755
40		1710.0769	1754.9004	1710	1755
50		1710.0364	1754.8531	1710	1755
20	L.V.	1710.0290	1754.8946	1710	1755
	H.V.	1710.0647	1754.9275	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	2500.0120	2569.8400	2500	2570
-20		2500.0738	2569.9051	2500	2570
-10		2500.0121	2569.8601	2500	2570
0		2500.0333	2569.9789	2500	2570
10		2500.1073	2569.9504	2500	2570
20		2500.0218	2569.8954	2500	2570
30		2500.0254	2569.8917	2500	2570
40		2500.0745	2569.9233	2500	2570
50		2500.0654	2569.8795	2500	2570
20	L.V.	2500.1039	2569.9314	2500	2570
	H.V.	2500.0730	2569.8628	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	699.0661	715.9632	699	716
-20		699.0384	715.9668	699	716
-10		699.0473	715.9677	699	716
0		699.0003	715.9368	699	716
10		699.0326	715.9656	699	716
20		699.0607	715.9482	699	716
30		699.0628	715.9479	699	716
40		699.0347	715.9813	699	716
50		699.0562	715.9450	699	716
20	L.V.	699.0382	715.9688	699	716
	H.V.	699.0033	715.9516	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	N.V.	704.0213	715.9214	704	716
-20		704.0325	715.9321	704	716
-10		704.0369	715.9362	704	716
0		704.0589	715.9231	704	716
10		704.0639	715.9632	704	716
20		704.0568	715.9625	704	716
30		704.0689	715.9632	704	716
40		704.0487	715.9282	704	716
50		704.0362	715.9125	704	716
20	L.V.	704.0526	715.9254	704	716
	H.V.	704.0632	715.9632	704	716

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