




FCC PART 27  
FCC PART 22H, PART 24E  
TEST REPORT

For

**Shenzhen Youmi Intelligent Technology Co., Ltd.**

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**FCC ID: 2ATZ4-ABLE01**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Tablet personal computer
<b>Report Number:</b> SZ1210901-53956E-RF-00D	
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Product	Tablet personal computer
Tested Model	MT01
Multiple Models	MT02, MT03, MT04
Model Differences	Please refer to DOS letter
Trade Name	UMIDIGI
Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(RX) LTE Band 41: 2535-2655MHz(TX/RX)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA Band 5/LTE Band 5: -2.1dBi PCS1900/WCDMA Band 2/ LTE Band 2: 1.4dBi LTE Band 7/LTE Band 41: 2.4dBi (provided by the applicant)
Voltage Range	DC 3.8V from battery or DC 5V from adapter
Sample serial number	SZ1210901-53956E-RF-S2 for Radiated Emission Test SZ1210901-53956E-RF-S1 for RF Conducted test (Assigned by ATC, Shenzhen)
Received date	2021-09-01
Sample/EUT Status	Good condition
Normal/Extreme Condition	L.V.: Low Voltage 3.2V <sub>DC</sub> N.V.: Normal Voltage 3.8V <sub>DC</sub> H.V.: High Voltage 4.35V <sub>DC</sub> Note: The extreme condition was declared by the applicant
Adapter information	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5V, 2A

### Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions 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		±0.082*10 <sup>-7</sup>
Emissions, Radiated	30MHz - 1GHz	±4.28dB
	1GHz - 18GHz	±4.98dB
	18GHz - 26.5GHz	±5.06dB
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 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 (ISED), 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	836.6	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	836.6	846.6
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560
LTE 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.

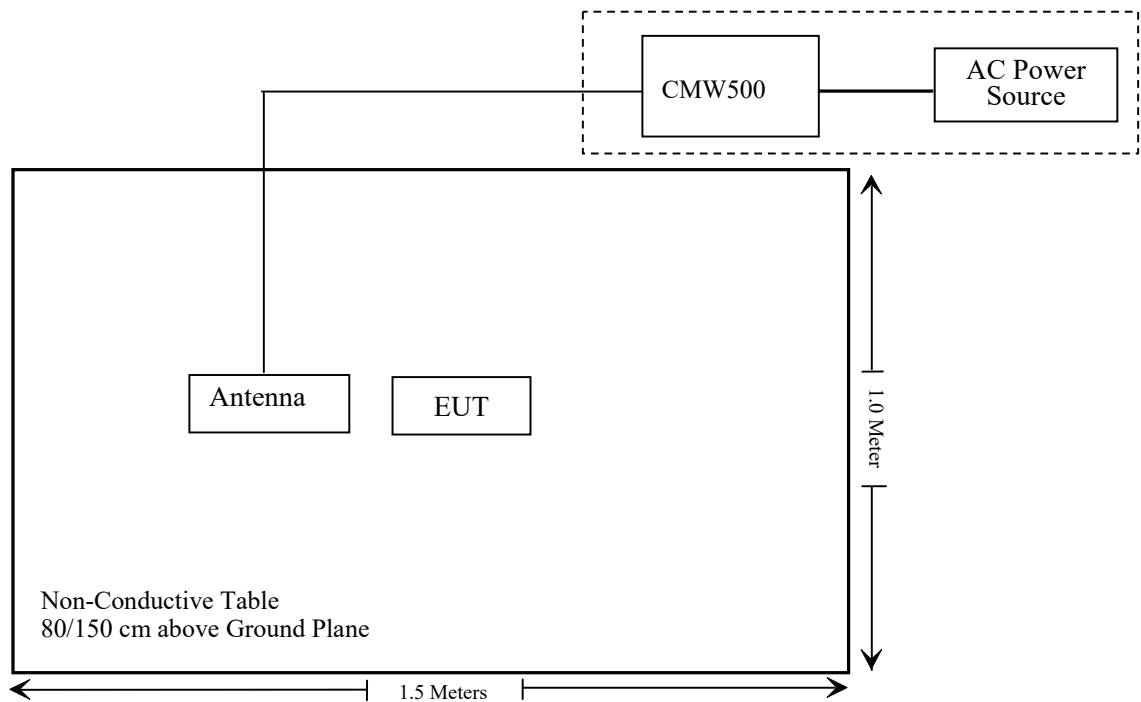
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-116218-UY

### 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**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§ 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(c)(h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

Note: \* Please refer to SAR report released by ATC, report number: SZ1210901-53956E-20.

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/07/08	2022/07/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenn	BBHA9120D	9120D-655	2020/01/05	2023/01/04
PASTERNAK	Horn Antenn	PE9852/2F-20	1120	2020/01/05	2023/01/04
PASTERNAK	Horn Antenn	PE9852/2F-20	720	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
Wainwright	High Pass Filter	WHKX3.6/18G-10SS	5	2020/12/25	2021/12/24
CD	High Pass Filter	HPM-1.2/18G-60	110	2020/12/25	2021/12/24
Anritsu	Signal Generator	68369B	004114	2021/07/31	2022/07/30



Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2020/12/25	2021/12/24
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2020/12/25	2021/12/24
Gongwen	Temp. & Humid. Chamber	JB913R	GZ-WS004	2020/12/25	2021/12/24

\* **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)

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

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: SZ1210901-53956E-20.

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## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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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.

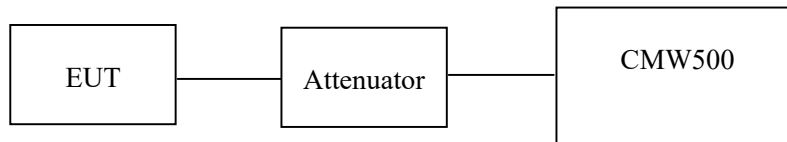
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1780MHz.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz & 2496-2690MHz.

### Test Procedure

*Conducted method:*

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



### Test Data

#### Environmental Conditions

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Ting Lv from 2021-09-15 to 2021-10-18.*

**Conducted Power****Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP (dBm)	Limit (dBm)
GSM	128	824.2	32.2	27.45	38.45
	190	836.6	32.6	27.85	38.45
	251	848.8	32.9	28.15	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	32.19	31.32	29.89	28.74	27.44	26.57	25.14	23.99	38.45
	190	836.6	32.29	31.41	29.98	28.96	27.54	26.66	25.23	24.21	38.45
	251	848.8	32.41	31.62	30.05	29.01	27.66	26.87	25.30	24.26	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		21.38	21.27	21.55	16.63	16.52	16.80
	HSDPA	1	22.03	21.33	21.54	17.28	16.58	16.79
		2	21.68	21.56	21.43	16.93	16.81	16.68
		3	21.89	21.38	21.48	17.14	16.63	16.73
		4	22.00	21.57	21.64	17.25	16.82	16.89
	HSUPA	1	21.56	21.10	21.10	16.81	16.35	16.35
		2	21.46	20.99	21.14	16.71	16.24	16.39
		3	21.48	21.04	21.11	16.73	16.29	16.36
		4	21.54	21.09	21.31	16.79	16.34	16.56
		5	21.67	21.38	21.33	16.92	16.63	16.58
	HSPA+	/	21.81	21.38	21.40	17.06	16.63	16.65

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

For GSM850/WCDMA Band 5: Antenna Gain = -2.1dBi = -4.25dBd (0dBd=2.15dBi),

Cable loss=0.5dB\*(provided by the applicant)

The limit: ERP ≤ 38.45dBm

**PCS Band (Part 24E)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	29.40	30.00	33
	661	1880.0	29.42	30.02	33
	810	1909.8	29.05	29.65	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	29.12	28.29	27.21	26.21	29.72	28.89	27.81	26.81	33
	661	1880.0	29.21	28.34	27.43	26.17	29.81	28.94	28.03	26.77	33
	810	1909.8	29.08	24.23	27.36	26.31	29.68	24.83	27.96	26.91	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		21.59	20.49	21.47	22.19	21.09	22.07
	HSDPA	1	21.95	21.32	21.47	22.55	21.92	22.07
		2	21.51	21.33	21.63	22.11	21.93	22.23
		3	22.07	21.36	21.58	22.67	21.96	22.18
		4	22.12	21.66	21.64	22.72	22.26	22.24
	HSUPA	1	21.60	21.14	21.23	22.20	21.74	21.83
		2	21.60	21.12	21.31	22.20	21.72	21.91
		3	21.49	21.01	21.11	22.09	21.61	21.71
		4	21.65	21.13	21.42	22.25	21.73	22.02
		5	21.80	21.21	21.38	22.40	21.81	21.98
	HSPA+	1	21.77	21.29	21.52	22.37	21.89	22.12

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

For PCS1900/WCDMA Band 2: Antenna Gain = 1.4dBi,

Cable loss=0.8dB\*(provided by the applicant)

The limit: EIRP ≤ 33dBm

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.52	13
	Middle	3.47	13
	High	3.49	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.54	13
	Middle	3.34	13
	High	3.60	13
HSDPA (16QAM)	Low	3.72	13
	Middle	3.34	13
	High	3.58	13
HSUPA (BPSK)	Low	3.35	13
	Middle	3.26	13
	High	3.50	13
HSUPA+	Low	3.61	13
	Middle	3.57	13
	High	3.32	13

**PCS Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.77	13
	Middle	3.63	13
	High	3.47	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.74	13
	Middle	3.56	13
	High	3.56	13
HSDPA (16QAM)	Low	3.53	13
	Middle	3.42	13
	High	3.40	13
HSUPA (BPSK)	Low	3.15	13
	Middle	3.21	13
	High	3.60	13
HSUPA+	Low	3.50	13
	Middle	3.59	13
	High	3.33	13

**LTE Band 2:****Maximum Output Power**

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	21.82	21.86	21.71	22.42	22.46	22.31
		RB1#3	22.22	22.03	21.93	22.82	22.63	22.53
		RB1#5	22.02	21.85	21.69	22.62	22.45	22.29
		RB3#0	22.14	21.92	21.82	22.74	22.52	22.42
		RB3#3	22.12	21.89	21.83	22.72	22.49	22.43
		RB6#0	21.11	20.93	20.82	21.71	21.53	21.42
	16QAM	RB1#0	21.03	20.95	20.74	21.63	21.55	21.34
		RB1#3	21.21	21.16	21.04	21.81	21.76	21.64
		RB1#5	21.03	20.97	20.76	21.63	21.57	21.36
		RB3#0	21.30	20.89	20.86	21.9	21.49	21.46
		RB3#3	21.27	20.88	20.85	21.87	21.48	21.45
		RB6#0	20.21	20.01	19.73	20.81	20.61	20.33
3.0	QPSK	RB1#0	22.06	21.86	21.76	22.66	22.46	22.36
		RB1#8	22.02	21.90	21.74	22.62	22.5	22.34
		RB1#14	21.99	21.85	21.71	22.59	22.45	22.31
		RB6#0	21.00	20.87	20.72	21.6	21.47	21.32
		RB6#9	21.01	20.81	20.69	21.61	21.41	21.29
		RB15#0	21.06	20.85	20.74	21.66	21.45	21.34
	16QAM	RB1#0	21.64	21.01	20.77	22.24	21.61	21.37
		RB1#8	21.63	21.01	20.75	22.23	21.61	21.35
		RB1#14	21.60	21.03	20.72	22.2	21.63	21.32
		RB6#0	20.17	19.90	19.71	20.77	20.5	20.31
		RB6#9	20.12	19.91	19.66	20.72	20.51	20.26
		RB15#0	20.14	19.84	19.76	20.74	20.44	20.36



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	21.98	21.80	21.65	22.58	22.4	22.25
		RB1#13	22.09	21.90	21.79	22.69	22.5	22.39
		RB1#24	21.93	21.76	21.64	22.53	22.36	22.24
		RB15#0	21.02	20.86	20.84	21.62	21.46	21.44
		RB15#10	20.98	20.76	20.65	21.58	21.36	21.25
		RB25#0	20.99	20.79	20.72	21.59	21.39	21.32
	16QAM	RB1#0	20.86	21.05	20.73	21.46	21.65	21.33
		RB1#13	20.98	21.19	20.88	21.58	21.79	21.48
		RB1#24	20.83	21.00	20.74	21.43	21.6	21.34
		RB15#0	20.13	19.83	19.83	20.73	20.43	20.43
		RB15#10	20.09	19.79	19.66	20.69	20.39	20.26
		RB25#0	20.10	19.82	19.72	20.7	20.42	20.32
10.0	QPSK	RB1#0	22.02	21.88	21.71	22.62	22.48	22.31
		RB1#25	22.17	22.01	21.84	22.77	22.61	22.44
		RB1#49	21.86	21.82	21.71	22.46	22.42	22.31
		RB25#0	21.05	20.90	20.82	21.65	21.5	21.42
		RB25#25	20.98	20.73	20.62	21.58	21.33	21.22
		RB50#0	21.00	20.83	20.71	21.6	21.43	21.31
	16QAM	RB1#0	21.62	21.01	20.74	22.22	21.61	21.34
		RB1#25	21.75	21.11	20.90	22.35	21.71	21.5
		RB1#49	21.51	20.92	20.74	22.11	21.52	21.34
		RB25#0	20.13	19.92	19.90	20.73	20.52	20.5
		RB25#25	20.09	19.77	19.69	20.69	20.37	20.29
		RB50#0	20.05	19.86	19.70	20.65	20.46	20.3

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	21.90	21.79	21.65	22.5	22.39	22.25
		RB1#38	21.94	21.83	21.71	22.54	22.43	22.31
		RB1#74	21.79	21.74	21.61	22.39	22.34	22.21
		RB36#0	21.02	20.92	20.73	21.62	21.52	21.33
		RB36#39	20.96	20.78	20.65	21.56	21.38	21.25
		RB75#0	20.96	20.82	20.70	21.56	21.42	21.3
	16QAM	RB1#0	21.49	20.91	21.01	22.09	21.51	21.61
		RB1#38	21.54	20.97	21.10	22.14	21.57	21.7
		RB1#74	21.39	20.85	21.03	21.99	21.45	21.63
		RB36#0	20.04	19.93	19.71	20.64	20.53	20.31
		RB36#39	19.96	19.77	19.61	20.56	20.37	20.21
		RB75#0	19.98	19.84	19.63	20.58	20.44	20.23
20.0	QPSK	RB1#0	21.81	21.67	21.47	22.41	22.27	22.07
		RB1#50	22.13	22.04	21.85	22.73	22.64	22.45
		RB1#99	21.65	21.55	21.42	22.25	22.15	22.02
		RB50#0	20.96	20.92	20.74	21.56	21.52	21.34
		RB50#50	21.01	20.65	20.51	21.61	21.25	21.11
		RB100#0	21.01	20.82	20.67	21.61	21.42	21.27
	16QAM	RB1#0	21.12	20.85	21.04	21.72	21.45	21.64
		RB1#50	21.40	21.20	21.42	22	21.8	22.02
		RB1#99	20.91	20.75	20.98	21.51	21.35	21.58
		RB50#0	20.02	19.94	19.79	20.62	20.54	20.39
		RB50#50	20.03	19.67	19.49	20.63	20.27	20.09
		RB100#0	20.08	19.83	19.64	20.68	20.43	20.24

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

For LTE Band2: Antenna Gain = 1.4dBi, Cable loss=0.8dB\*(provided by the applicant)

The Limit: EIRP ≤ 33dBm

**Peak-to-average ratio (PAR)****20MHz Bandwidth**

<b>Modulation</b>	<b>Low channel (dB)</b>	<b>Middle channel (dB)</b>	<b>High channel (dB)</b>	<b>PAR Limit (dB)</b>	<b>Result</b>
QPSK (1RB Size)	5.25	4.64	5.71	13	Pass
QPSK (100RB Size)	5.45	5.04	5.19	13	Pass
16QAM (1RB Size)	6.23	5.59	6.35	13	Pass
16QAM (100RB Size)	6.23	6.00	6.14	13	Pass

**LTE Band 5:****Maximum Output Power**

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	22.64	22.65	22.65	17.89	17.90	17.90
		RB1#3	22.83	22.81	22.84	18.08	18.06	18.09
		RB1#5	22.62	22.66	22.69	17.87	17.91	17.94
		RB3#0	22.71	22.71	22.76	17.96	17.96	18.01
		RB3#3	22.72	22.72	22.84	17.97	17.97	18.09
		RB6#0	21.69	21.72	21.74	16.94	16.97	16.99
	16QAM	RB1#0	21.63	21.72	21.68	16.88	16.97	16.93
		RB1#3	21.83	21.92	21.89	17.08	17.17	17.14
		RB1#5	21.63	21.76	21.72	16.88	17.01	16.97
		RB3#0	21.88	21.69	21.82	17.13	16.94	17.07
		RB3#3	21.96	21.71	21.86	17.21	16.96	17.11
		RB6#0	20.79	20.83	20.68	16.04	16.08	15.93
3.0	QPSK	RB1#0	22.69	22.73	22.73	17.94	17.98	17.98
		RB1#8	22.62	22.72	22.74	17.87	17.97	17.99
		RB1#14	22.62	22.73	22.76	17.87	17.98	18.01
		RB6#0	21.67	21.70	21.71	16.92	16.95	16.96
		RB6#9	21.68	21.64	21.67	16.93	16.89	16.92
		RB15#0	21.71	21.68	21.74	16.96	16.93	16.99
	16QAM	RB1#0	22.26	21.86	21.77	17.51	17.11	17.02
		RB1#8	22.25	21.82	21.76	17.50	17.07	17.01
		RB1#14	22.25	21.85	21.79	17.50	17.10	17.04
		RB6#0	20.82	20.77	20.65	16.07	16.02	15.90
		RB6#9	20.82	20.77	20.63	16.07	16.02	15.88
		RB15#0	20.85	20.70	20.76	16.10	15.95	16.01

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	22.60	22.64	22.60	17.85	17.89	17.85
		RB1#13	22.77	22.74	22.77	18.02	17.99	18.02
		RB1#24	22.61	22.60	22.66	17.86	17.85	17.91
		RB15#0	21.65	21.70	21.87	16.90	16.95	17.12
		RB15#10	21.70	21.69	21.54	16.95	16.94	16.79
		RB25#0	21.68	21.64	21.68	16.93	16.89	16.93
	16QAM	RB1#0	21.51	21.92	21.70	16.76	17.17	16.95
		RB1#13	21.62	22.04	21.82	16.87	17.29	17.07
		RB1#24	21.54	21.91	21.75	16.79	17.16	17.00
		RB15#0	20.79	20.73	20.89	16.04	15.98	16.14
		RB15#10	20.80	20.72	20.52	16.05	15.97	15.77
		RB25#0	20.78	20.73	20.74	16.03	15.98	15.99
10.0	QPSK	RB1#0	22.67	22.70	22.69	17.92	17.95	17.94
		RB1#25	22.80	22.83	22.82	18.05	18.08	18.07
		RB1#49	22.65	22.65	22.76	17.90	17.90	18.01
		RB25#0	21.65	21.70	21.63	16.90	16.95	16.88
		RB25#25	21.80	21.72	21.41	17.05	16.97	16.66
		RB50#0	21.71	21.73	21.56	16.96	16.98	16.81
	16QAM	RB1#0	22.23	21.83	21.67	17.48	17.08	16.92
		RB1#25	22.45	22.02	21.83	17.70	17.27	17.08
		RB1#49	22.21	21.83	21.76	17.46	17.08	17.01
		RB25#0	20.80	20.78	20.73	16.05	16.03	15.98
		RB25#25	20.90	20.71	20.51	16.15	15.96	15.76
		RB50#0	20.77	20.79	20.57	16.02	16.04	15.82

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

For LTE Band 5: Antenna Gain = -2.1dBi = -4.25dBd (0dBd=2.15dBi)

Cable loss=0.5dB\*(provided by the applicant)

Limit: ERP≤38.45dBm

**Peak-to-average ratio (PAR)****10MHz bandwidth**

<b>Modulation</b>	<b>Low channel (dB)</b>	<b>Middle channel (dB)</b>	<b>High channel (dB)</b>	<b>PAR Limit (dB)</b>	<b>Result</b>
QPSK (1RB Size)	6.03	5.74	5.04	13	Pass
QPSK (50RB Size)	5.39	5.33	5.13	13	Pass
16QAM (1RB Size)	7.01	6.17	5.91	13	Pass
16QAM (50RB Size)	6.17	6.23	6.20	13	Pass

**LTE Band 7:****Maximum Output Power**

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	21.63	21.46	21.35	23.23	23.06	22.95
		RB1#13	21.71	21.56	21.46	23.31	23.16	23.06
		RB1#24	21.62	21.46	21.39	23.22	23.06	22.99
		RB15#0	20.72	20.57	20.56	22.32	22.17	22.16
		RB15#10	20.73	20.48	20.51	22.33	22.08	22.11
		RB25#0	20.70	20.51	20.47	22.30	22.11	22.07
	16QAM	RB1#0	20.56	20.75	20.48	22.16	22.35	22.08
		RB1#13	20.66	20.85	20.58	22.26	22.45	22.18
		RB1#24	20.52	20.73	20.51	22.12	22.33	22.11
		RB15#0	19.74	19.49	19.55	21.34	21.09	21.15
		RB15#10	19.74	19.44	19.47	21.34	21.04	21.07
		RB25#0	19.72	19.48	19.50	21.32	21.08	21.10
10.0	QPSK	RB1#0	21.69	21.50	21.48	23.29	23.10	23.08
		RB1#25	21.80	21.71	21.61	23.40	23.31	23.21
		RB1#49	21.63	21.49	21.49	23.23	23.09	23.09
		RB25#0	20.65	20.54	20.49	22.25	22.14	22.09
		RB25#25	20.74	20.55	20.49	22.34	22.15	22.09
		RB50#0	20.73	20.52	20.46	22.33	22.12	22.06
	16QAM	RB1#0	21.24	20.68	20.51	22.84	22.28	22.11
		RB1#25	21.39	20.80	20.60	22.99	22.40	22.20
		RB1#49	21.20	20.65	20.47	22.80	22.25	22.07
		RB25#0	19.70	19.54	19.57	21.30	21.14	21.17
		RB25#25	19.75	19.52	19.57	21.35	21.12	21.17
		RB50#0	19.66	19.50	19.47	21.26	21.10	21.07

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	21.60	21.44	21.37	23.20	23.04	22.97
		RB1#38	21.69	21.55	21.48	23.29	23.15	23.08
		RB1#74	21.49	21.40	21.39	23.09	23.00	22.99
		RB36#0	20.72	20.60	20.55	22.32	22.20	22.15
		RB36#39	20.73	20.55	20.55	22.33	22.15	22.15
		RB75#0	20.75	20.57	20.52	22.35	22.17	22.12
	16QAM	RB1#0	21.13	20.59	20.76	22.73	22.19	22.36
		RB1#38	21.26	20.67	20.87	22.86	22.27	22.47
		RB1#74	21.06	20.57	20.79	22.66	22.17	22.39
		RB36#0	19.71	19.53	19.44	21.31	21.13	21.04
		RB36#39	19.70	19.50	19.45	21.30	21.10	21.05
		RB75#0	19.68	19.54	19.45	21.28	21.14	21.05
20.0	QPSK	RB1#0	21.46	21.34	21.19	23.06	22.94	22.79
		RB1#50	21.77	21.70	21.57	23.37	23.30	23.17
		RB1#99	21.32	21.27	21.20	22.92	22.87	22.80
		RB50#0	20.63	20.56	20.50	22.23	22.16	22.10
		RB50#50	20.70	20.50	20.45	22.30	22.10	22.05
		RB100#0	20.69	20.53	20.47	22.29	22.13	22.07
	16QAM	RB1#0	20.79	20.53	20.78	22.39	22.13	22.38
		RB1#50	21.11	20.90	21.15	22.71	22.50	22.75
		RB1#99	20.63	20.48	20.76	22.23	22.08	22.36
		RB50#0	19.59	19.49	19.46	21.19	21.09	21.06
		RB50#50	19.63	19.46	19.38	21.23	21.06	20.98
		RB100#0	19.68	19.51	19.45	21.28	21.11	21.05

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

For LTE Band7: Antenna Gain =2.4dBi, Cable loss=0.8dB\*(provided by the applicant)

Limit: EIRP ≤ 33dBm



**Peak-to-average ratio (PAR)****20MHz bandwidth**

<b>Modulation</b>	<b>Low channel (dB)</b>	<b>Middle channel (dB)</b>	<b>High channel (dB)</b>	<b>PAR Limit (dB)</b>	<b>Result</b>
QPSK (1RB Size)	4.72	4.90	5.28	13	Pass
QPSK (100RB Size)	4.90	4.84	4.99	13	Pass
16QAM (1RB Size)	5.45	5.39	5.97	13	Pass
16QAM (100RB Size)	5.80	5.94	6.06	13	Pass

**LTE Band 41:****Maximum Output Power**

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	21.30	21.34	21.33	22.90	22.94	22.93
		RB1#13	21.65	21.64	21.67	23.25	23.24	23.27
		RB1#24	21.28	21.33	21.29	22.88	22.93	22.89
		RB15#0	21.30	21.31	21.31	22.90	22.91	22.91
		RB15#10	21.30	21.35	21.31	22.90	22.95	22.91
		RB25#0	20.44	20.44	20.44	22.04	22.04	22.04
	16QAM	RB1#0	20.35	20.35	20.36	21.95	21.95	21.96
		RB1#13	20.72	20.63	20.67	22.32	22.23	22.27
		RB1#24	20.33	20.35	20.35	21.93	21.95	21.95
		RB15#0	20.35	20.34	20.35	21.95	21.94	21.95
		RB15#10	20.33	20.35	20.35	21.93	21.95	21.95
		RB25#0	19.42	19.43	19.44	21.02	21.03	21.04
10.0	QPSK	RB1#0	21.32	21.32	21.34	22.92	22.92	22.94
		RB1#25	21.74	21.65	21.67	23.34	23.25	23.27
		RB1#49	21.33	21.30	21.34	22.93	22.90	22.94
		RB25#0	20.42	20.43	20.44	22.02	22.03	22.04
		RB25#25	20.42	20.41	20.39	22.02	22.01	21.99
		RB50#0	20.52	20.50	20.51	22.12	22.10	22.11
	16QAM	RB1#0	20.42	20.36	20.35	22.02	21.96	21.95
		RB1#25	20.67	20.76	20.63	22.27	22.36	22.23
		RB1#49	20.36	20.32	20.34	21.96	21.92	21.94
		RB25#0	19.42	19.42	19.46	21.02	21.02	21.06
		RB25#25	19.43	19.40	19.41	21.03	21.00	21.01
		RB50#0	19.46	19.47	19.46	21.06	21.07	21.06

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	21.33	21.32	21.32	22.93	22.92	22.92
		RB1#38	21.67	21.69	21.70	23.27	23.29	23.30
		RB1#74	21.33	21.30	21.31	22.93	22.90	22.91
		RB36#0	20.52	20.52	20.53	22.12	22.12	22.13
		RB36#39	20.51	20.51	20.51	22.11	22.11	22.11
		RB75#0	20.56	20.56	20.54	22.16	22.16	22.14
	16QAM	RB1#0	20.36	20.38	20.36	21.96	21.98	21.96
		RB1#38	20.65	20.65	20.72	22.25	22.25	22.32
		RB1#74	20.35	20.36	20.33	21.95	21.96	21.93
		RB36#0	19.45	19.45	19.46	21.05	21.05	21.06
		RB36#39	19.42	19.44	19.44	21.02	21.04	21.04
		RB75#0	19.54	19.52	19.53	21.14	21.12	21.13
20.0	QPSK	RB1#0	21.34	21.33	21.34	22.94	22.93	22.94
		RB1#50	21.64	21.65	21.70	23.24	23.25	23.30
		RB1#99	21.30	21.35	21.30	22.90	22.95	22.90
		RB50#0	20.52	20.49	20.51	22.12	22.09	22.11
		RB50#50	20.46	20.46	20.44	22.06	22.06	22.04
		RB100#0	20.45	20.48	20.45	22.05	22.08	22.05
	16QAM	RB1#0	20.38	20.38	20.36	21.98	21.98	21.96
		RB1#50	20.59	20.68	20.71	22.19	22.28	22.31
		RB1#99	20.35	20.35	20.36	21.95	21.95	21.96
		RB50#0	19.46	19.47	19.43	21.06	21.07	21.03
		RB50#50	19.43	19.41	19.41	21.03	21.01	21.01
		RB100#0	19.46	19.45	19.42	21.06	21.05	21.02

Note:  $EIRP(dBm) = \text{Conducted Power}(dBm) + \text{Antenna Gain}(dBi) - \text{Cable loss}(dB)$

For LTE Band41: Antenna Gain = 2.4dBi, Cable loss=0.8dB\*(provided by the applicant)

Limit:  $EIRP \leq 33dBm$

**Peak-to-average ratio (PAR)****20MHz bandwidth**

<b>Modulation</b>	<b>Low channel (dB)</b>	<b>Middle channel (dB)</b>	<b>High channel (dB)</b>	<b>PAR Limit (dB)</b>	<b>Result</b>
QPSK (1RB Size)	5.22	5.71	5.46	13	Pass
QPSK (100RB Size)	5.41	5.36	5.38	13	Pass
16QAM (1RB Size)	6.55	5.42	5.32	13	Pass
16QAM (100RB Size)	6.30	7.65	6.06	13	Pass

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

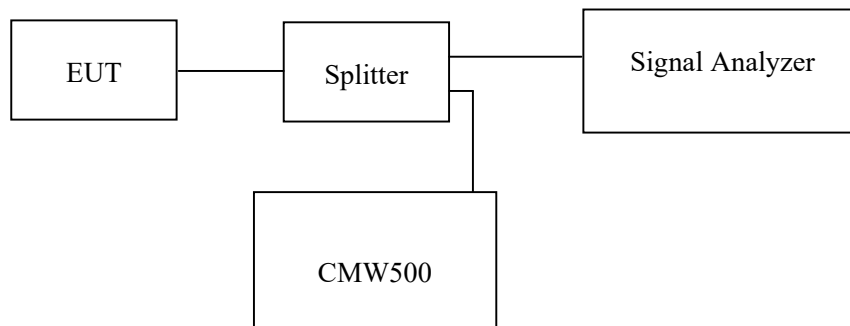
### Applicable Standard

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 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

*The testing was performed by Ting Lv from 2021-09-16 to 2021-11-11.*

*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	243.13	312.60
	190	836.6	244.57	311.10
	251	848.8	243.13	321.30

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.18	4.72
	836.6	4.15	4.70
	846.6	4.17	4.70
HSDPA	826.4	4.18	4.70
	836.6	4.15	4.70
	846.6	4.17	4.70
HSUPA	826.4	4.17	4.70
	836.6	4.15	4.69
	846.6	4.15	4.70

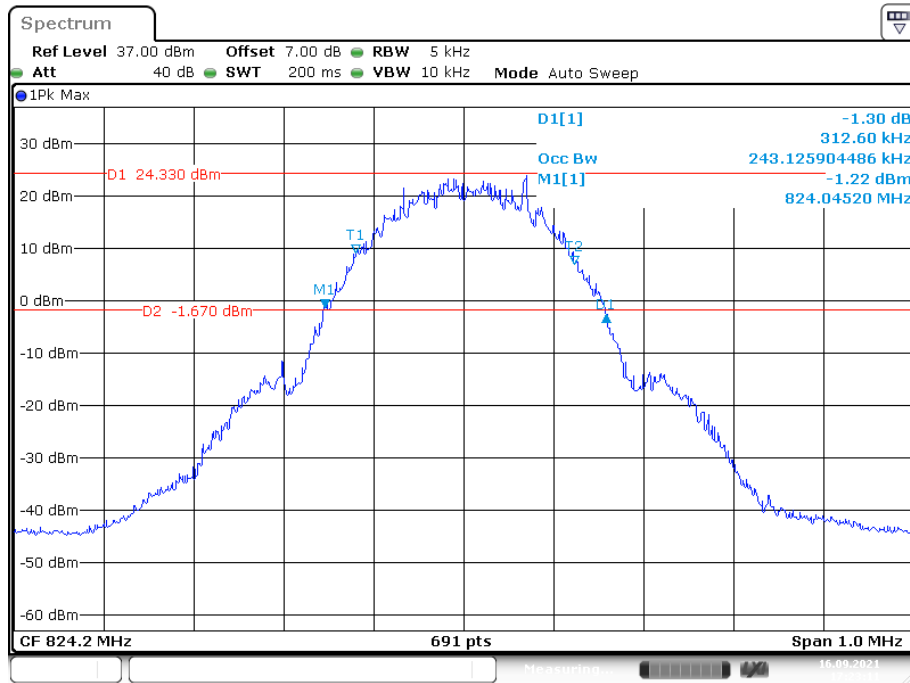
**PCS Band (Part 24E)**

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	246.02	312.60
	661	1880.0	246.02	316.90
	810	1909.8	244.57	312.60

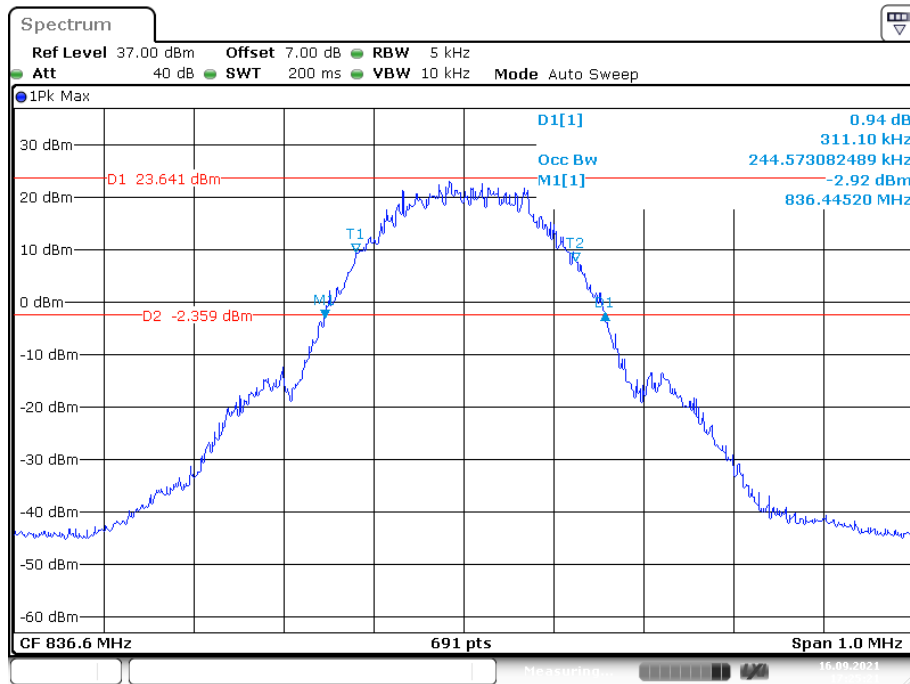
	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.18	4.70
	1880.0	4.17	4.72
	1907.6	4.17	4.72
HSDPA	1852.4	4.18	4.70
	1880.0	4.17	4.72
	1907.6	4.18	4.69
HSUPA	1852.4	4.21	5.07
	1880.0	4.20	4.70
	1907.6	4.18	4.72

**Cellular Band (Part 22H)**

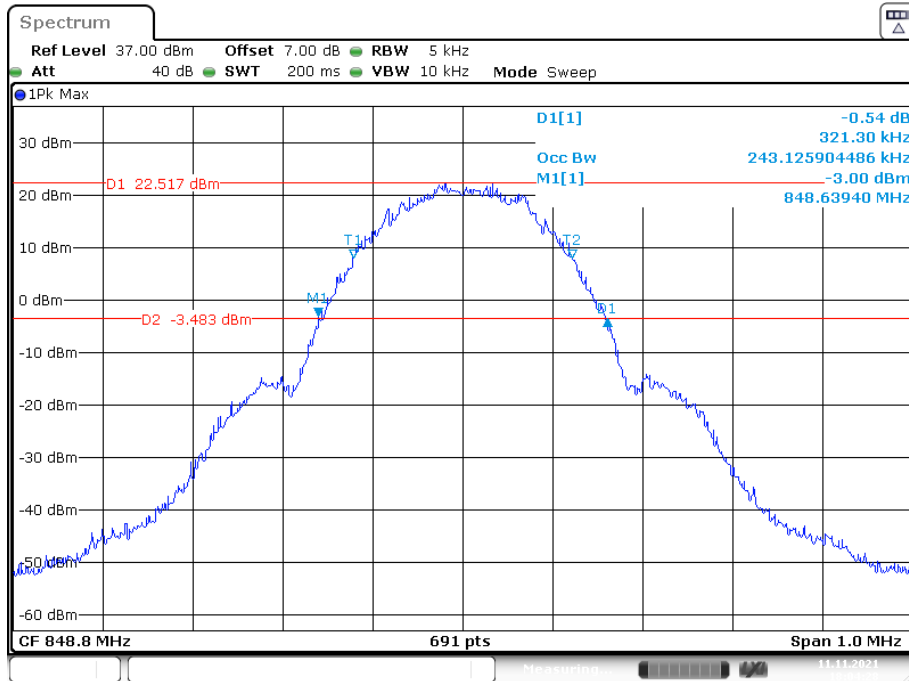
**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel**



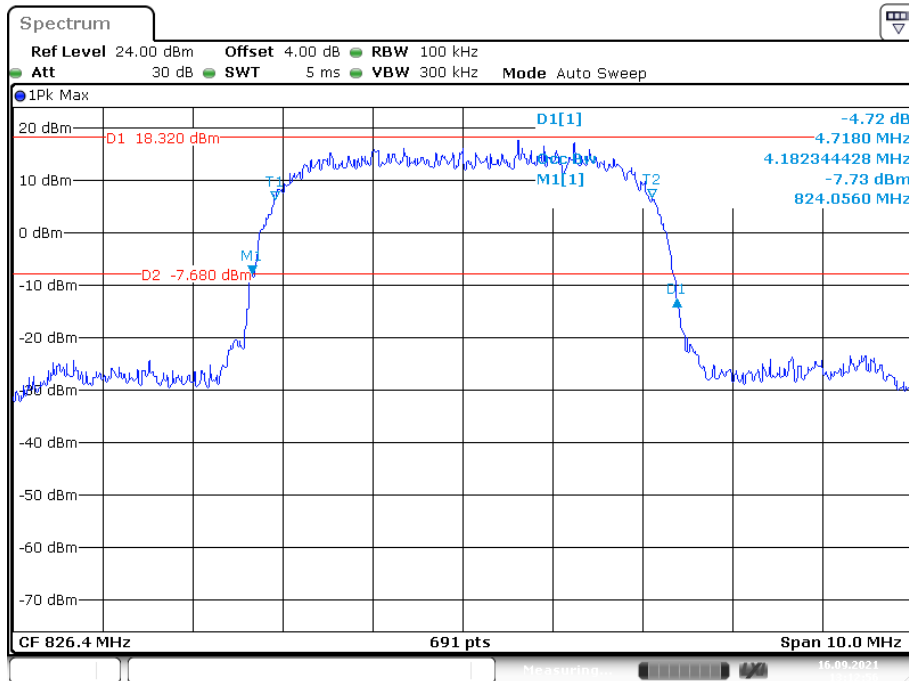
**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel**



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

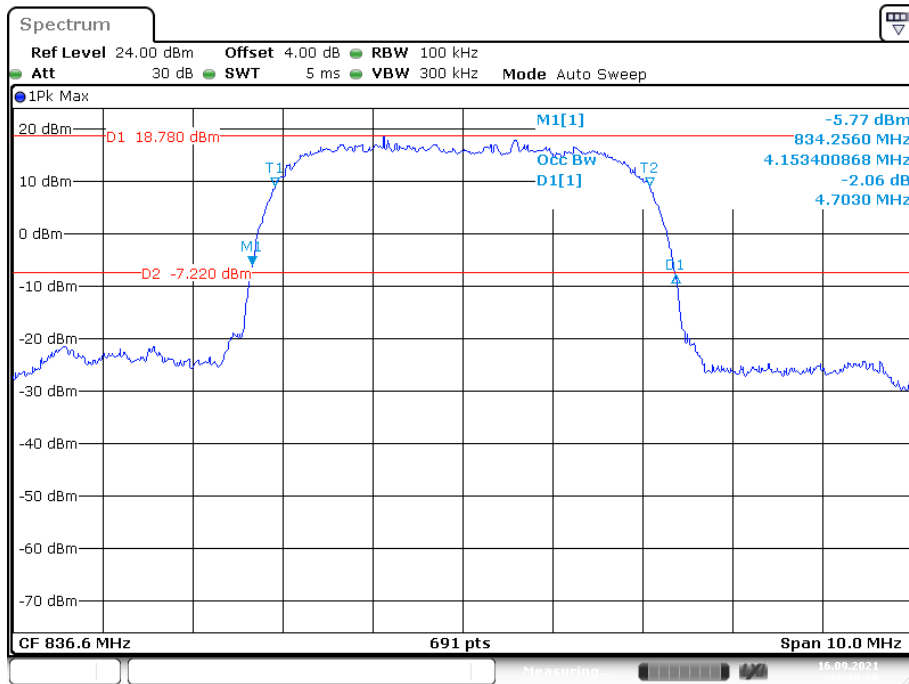


**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel**

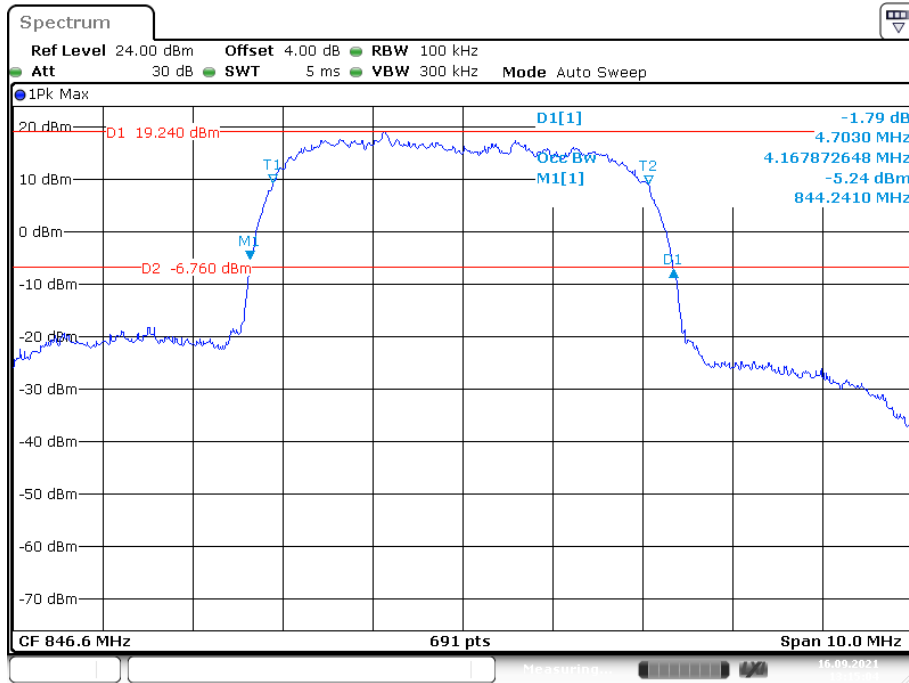




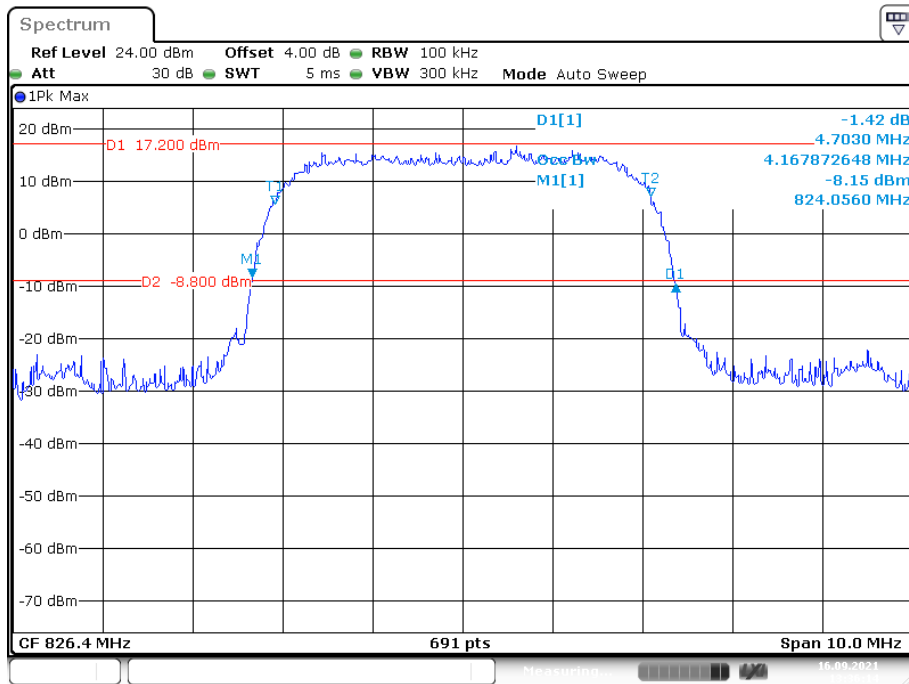
**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**



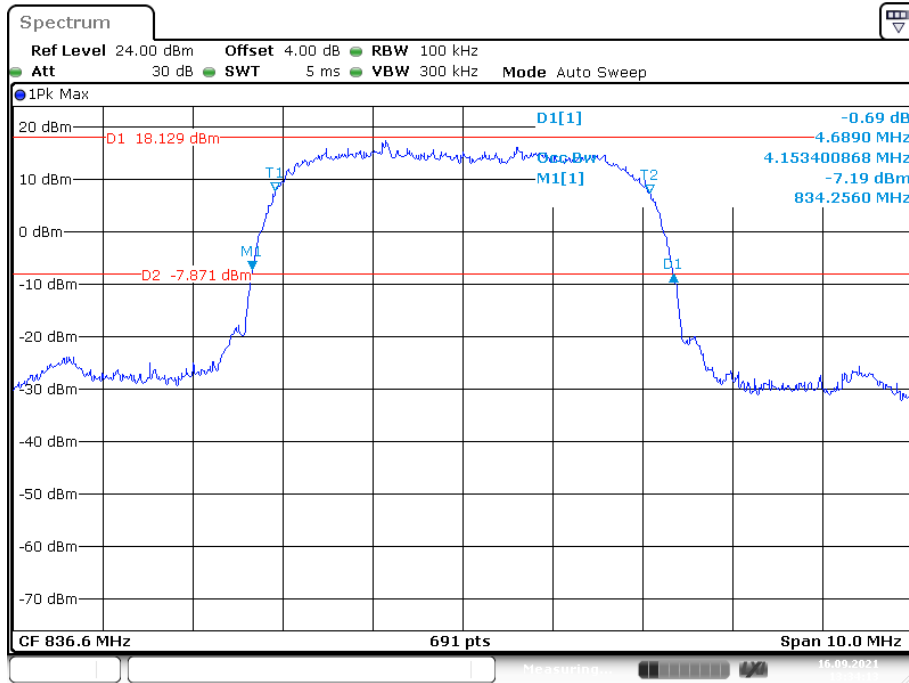
**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**



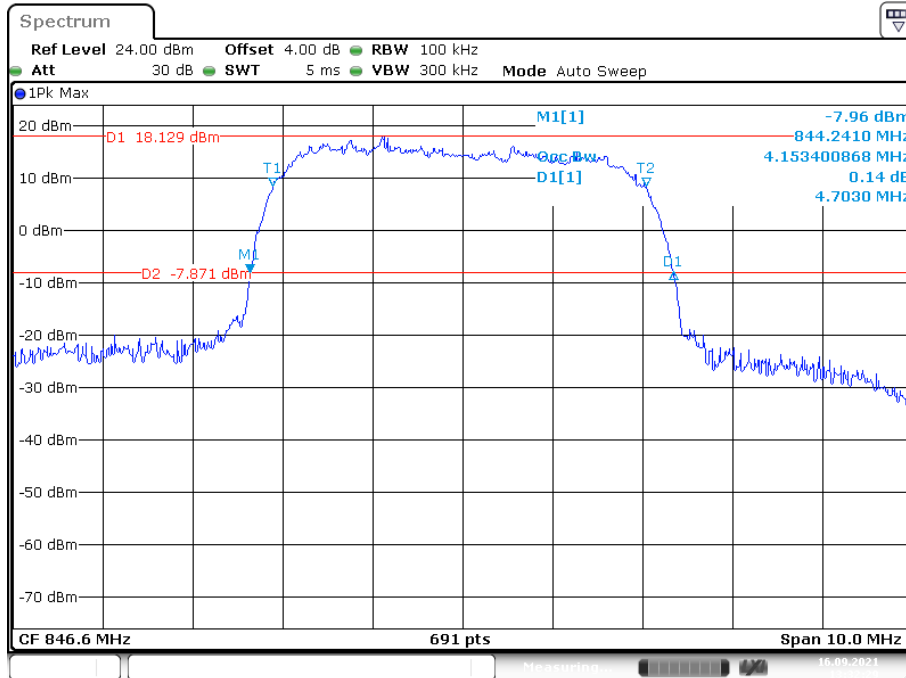
**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel**



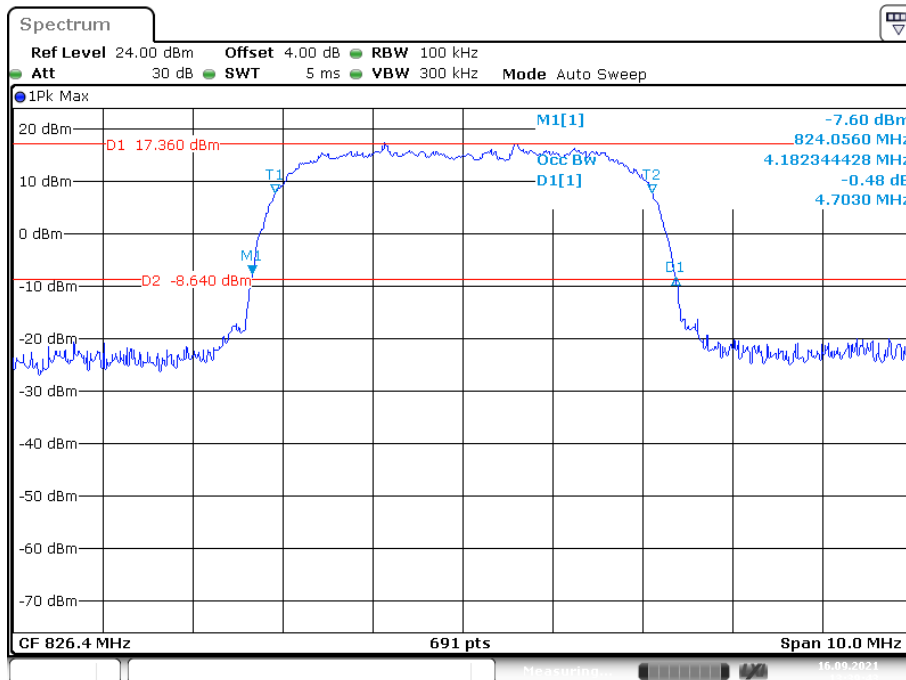
**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel**



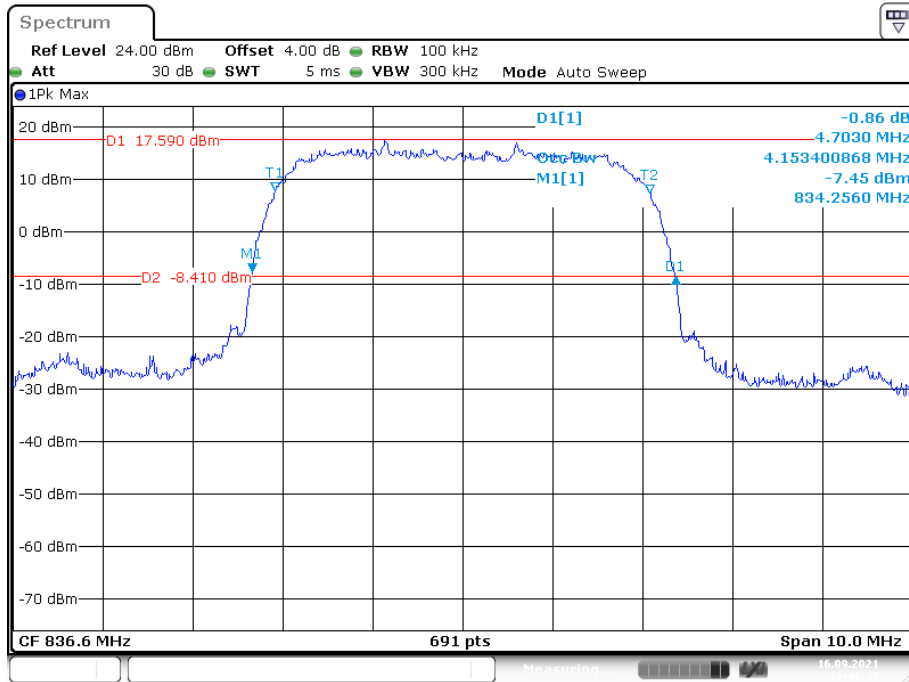
**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel**



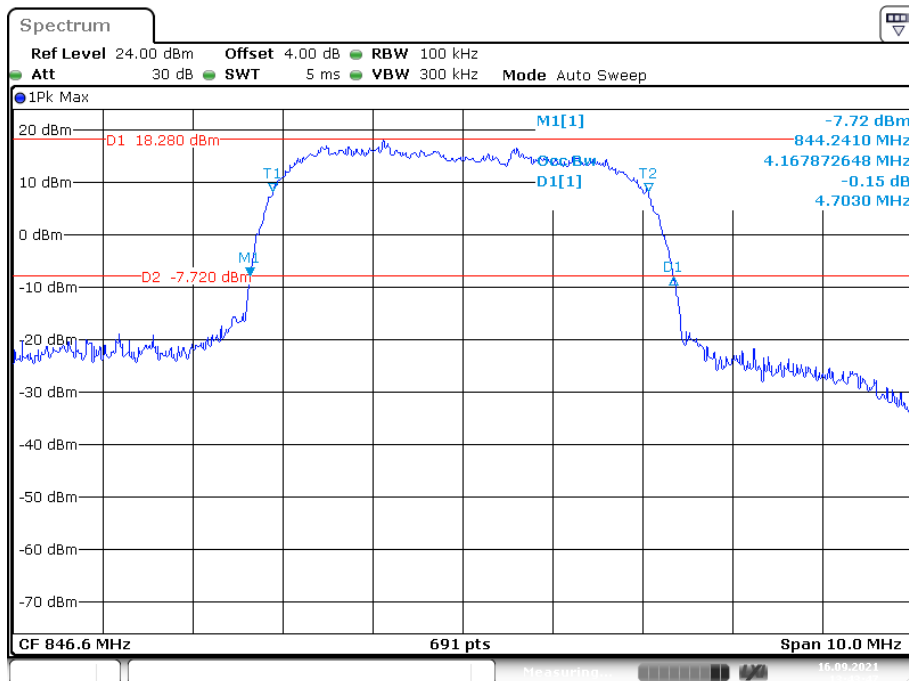
**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel**



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

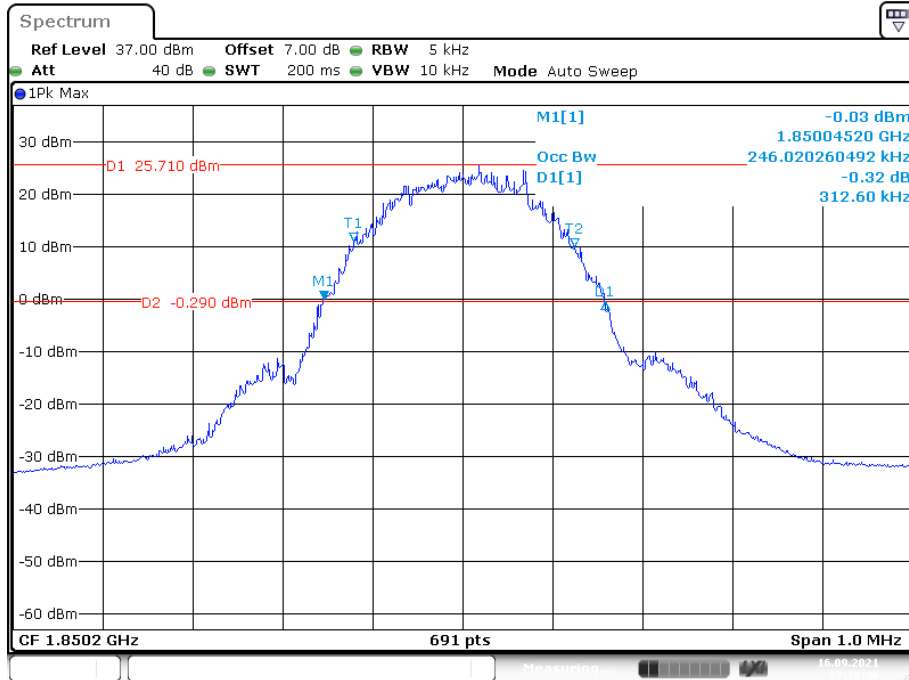


**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

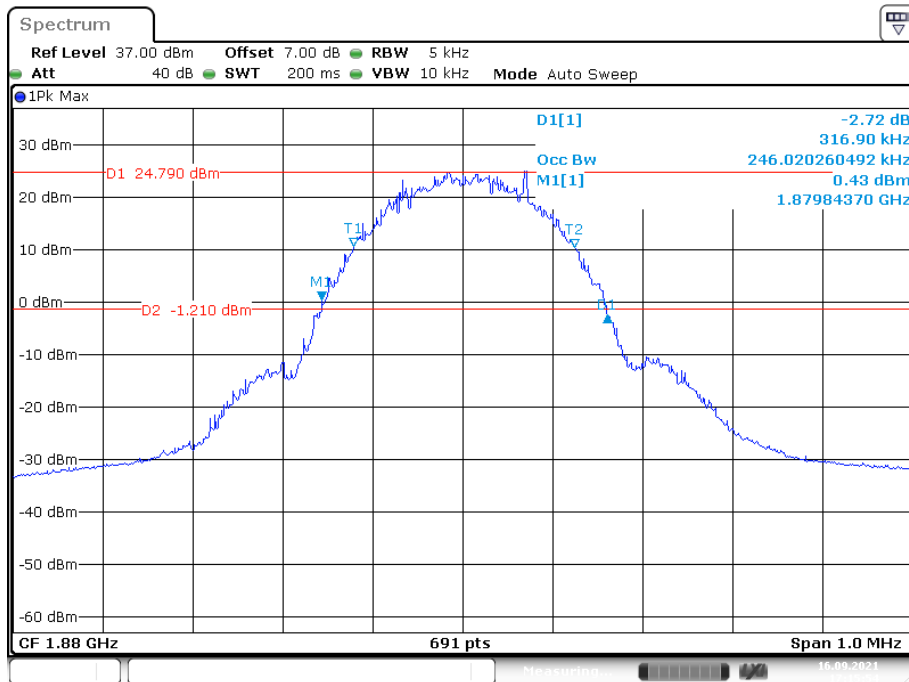


PCS Band (Part 24E)

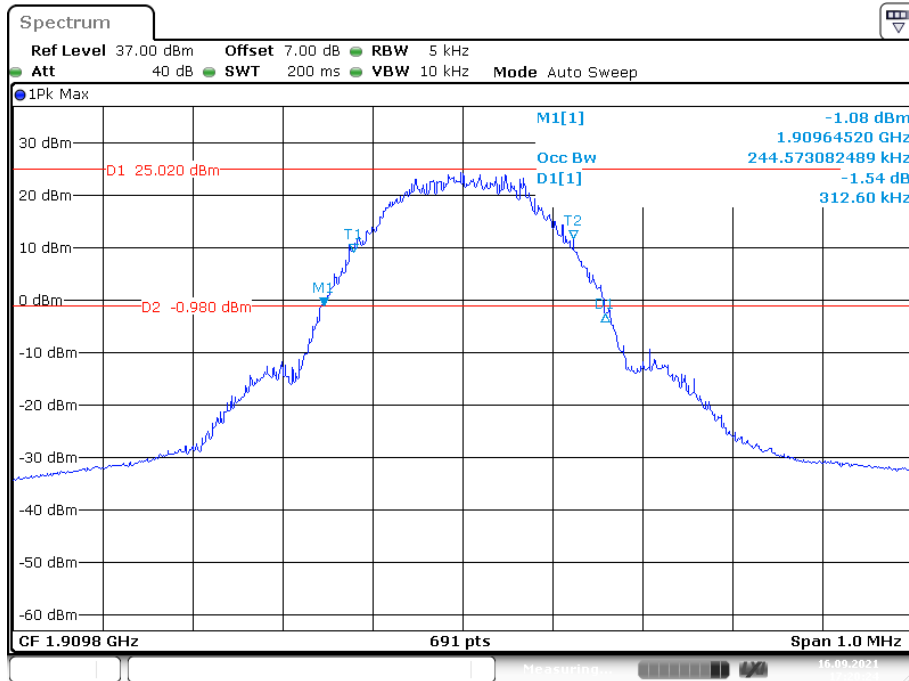
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel



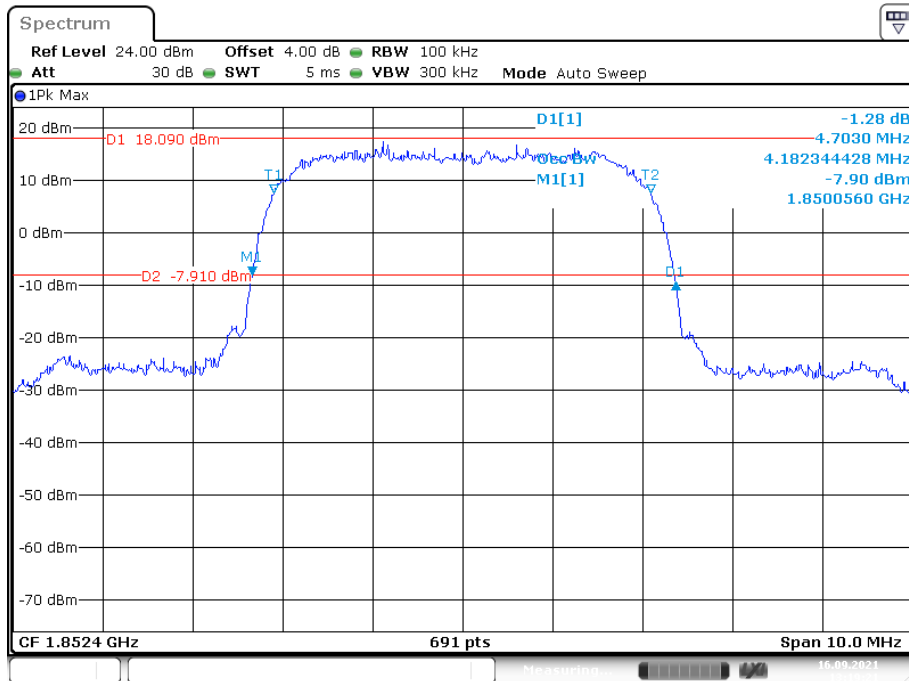
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel



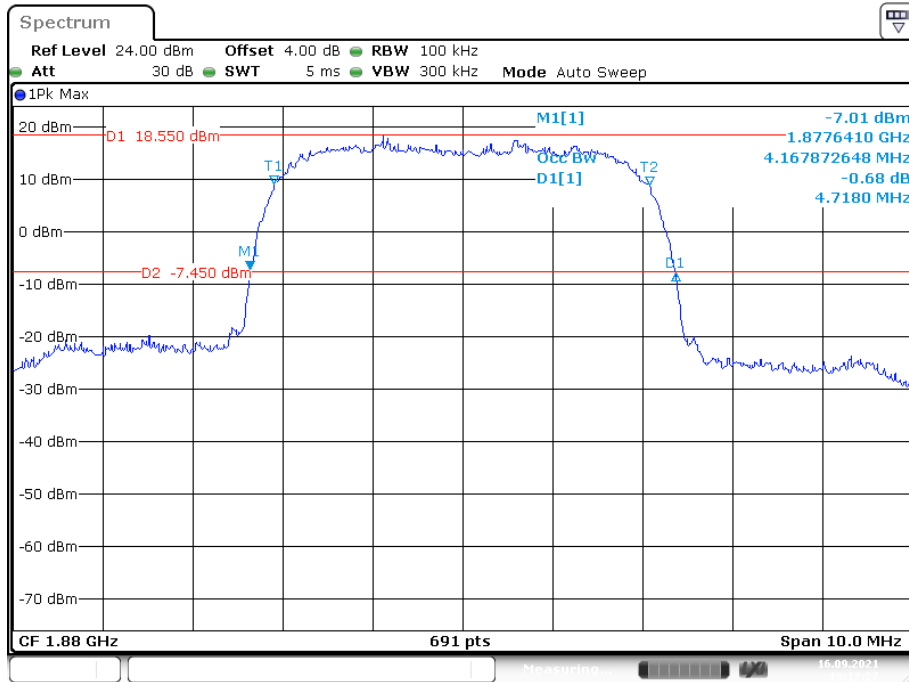
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, High channel



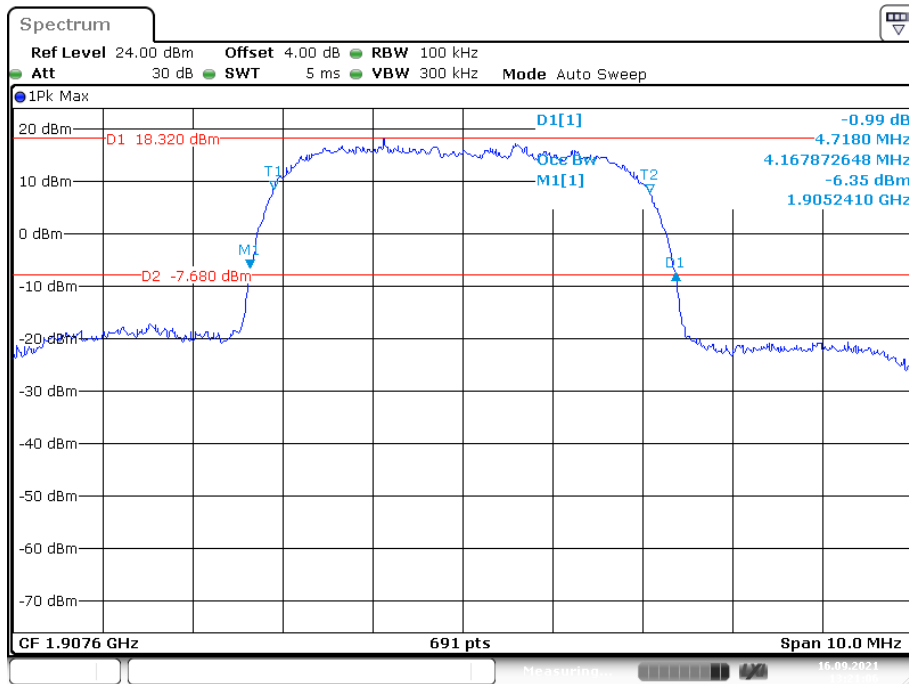
26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



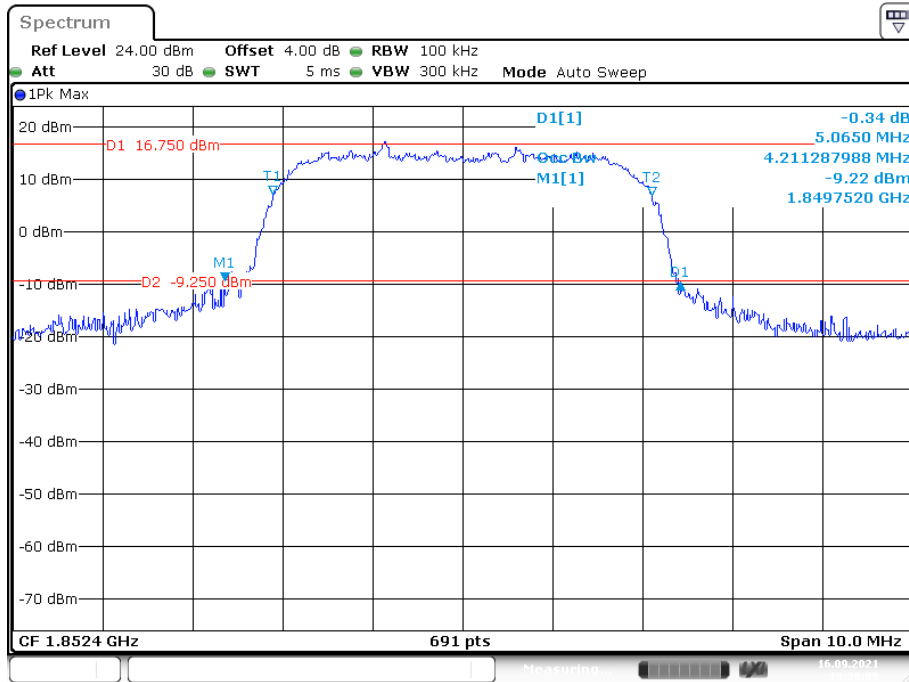
**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**



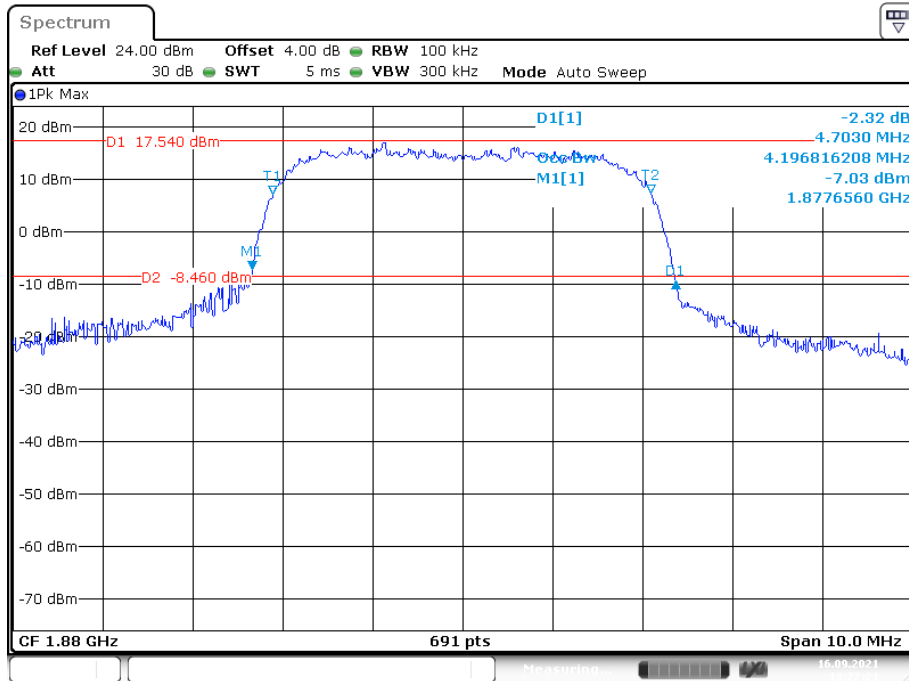
**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**



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

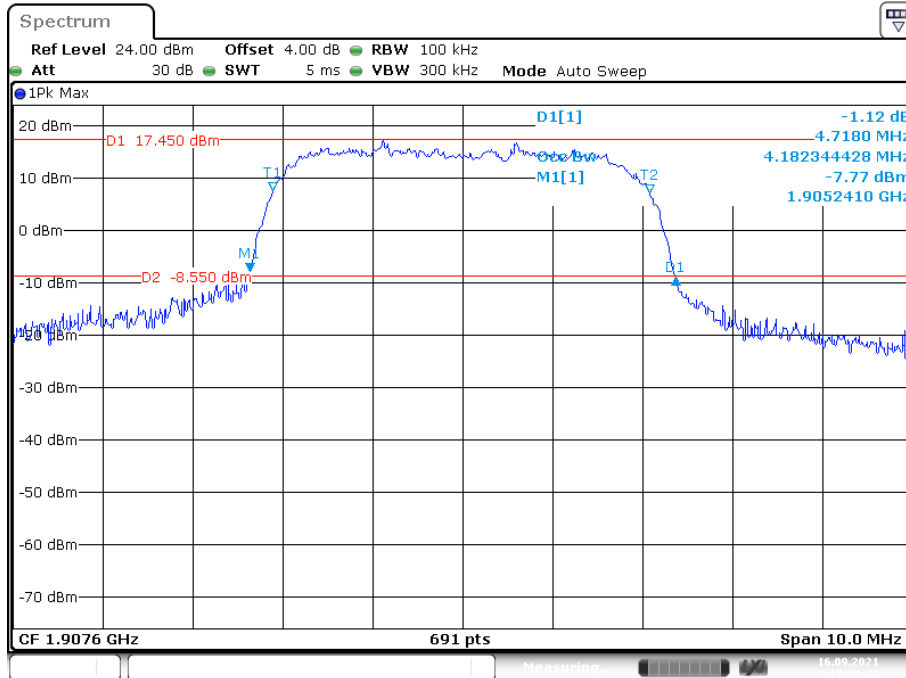


**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel**

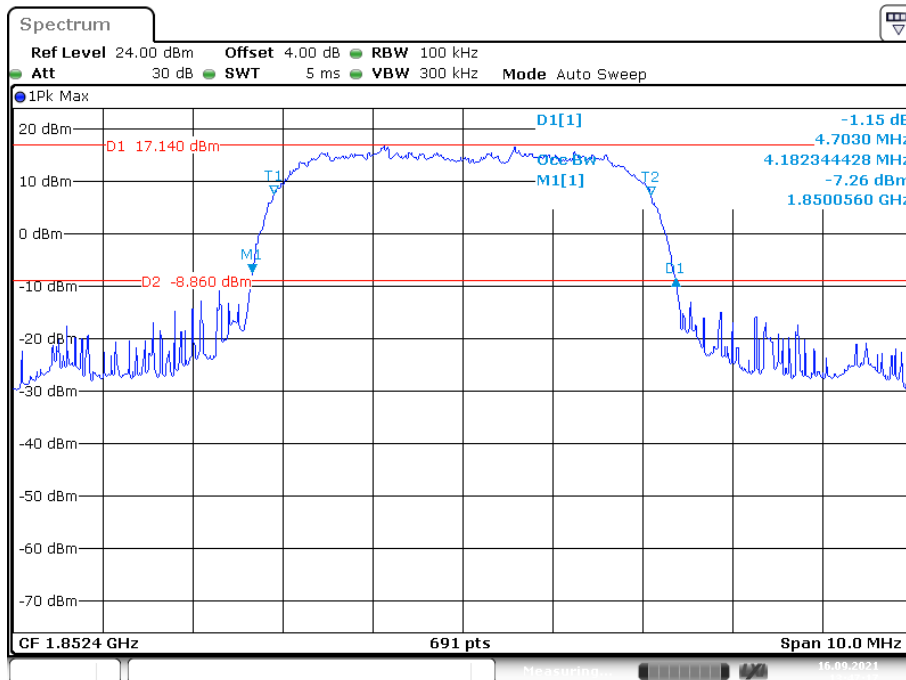




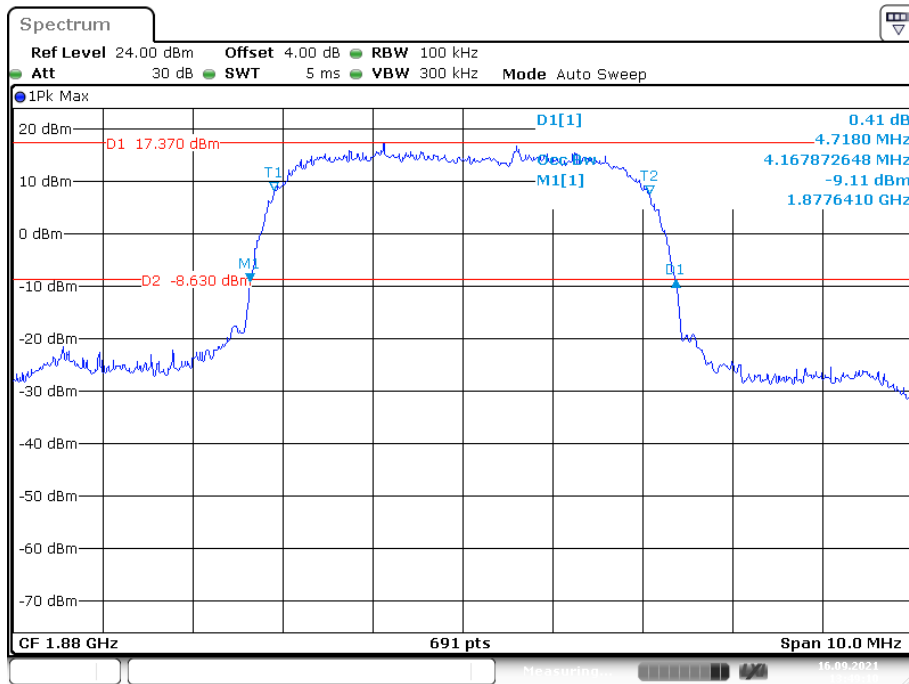
**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel**



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

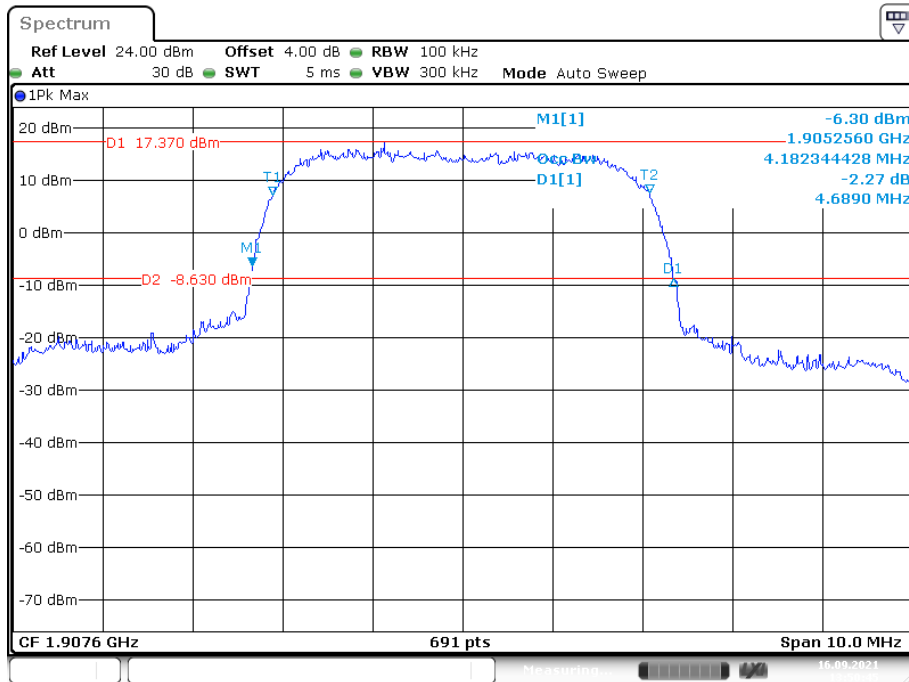


**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**



Date: 16.SEP.2021 13:49:10

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



Date: 16.SEP.2021 13:50:45

**LTE Band 2:**

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.102	1.302	1.096	1.314	1.102	1.326
	16QAM	1.096	1.296	1.096	1.326	1.090	1.290
3 MHz	QPSK	2.683	2.880	2.683	2.880	2.683	2.892
	16QAM	2.683	2.892	2.683	2.880	2.683	2.868
5 MHz	QPSK	4.511	4.960	4.511	4.960	4.491	4.940
	16QAM	4.471	4.920	4.511	5.020	4.511	4.980
10 MHz	QPSK	8.942	9.720	8.942	9.600	8.982	9.560
	16QAM	8.942	9.560	8.942	9.600	8.982	9.560
15 MHz	QPSK	13.533	14.760	13.413	14.580	13.473	14.700
	16QAM	13.533	14.760	13.473	14.580	13.473	14.640
20 MHz	QPSK	17.964	19.200	17.884	19.280	17.964	19.360
	16QAM	17.964	19.360	17.884	19.360	17.884	19.360

**LTE Band 5:**

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.096	1.296	1.096	1.320	1.102	1.290
	16QAM	1.096	1.314	1.090	1.290	1.096	1.290
3 MHz	QPSK	2.683	2.880	2.683	2.868	2.683	2.880
	16QAM	2.683	2.892	2.683	2.880	2.671	2.880
5 MHz	QPSK	4.511	4.960	4.511	4.960	4.491	4.900
	16QAM	4.471	4.940	4.511	4.960	4.491	4.940
10 MHz	QPSK	8.942	9.720	8.942	9.600	8.901	9.560
	16QAM	8.942	9.520	8.942	9.640	8.901	9.520

**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	4.960	4.511	4.960	4.491	4.940
	16QAM	4.471	4.960	4.511	4.960	4.511	4.960
10 MHz	QPSK	8.942	9.720	8.942	9.560	8.942	9.600
	16QAM	8.942	9.560	8.942	9.600	8.942	9.600
15 MHz	QPSK	13.473	14.700	13.413	14.640	13.473	14.760
	16QAM	13.473	14.700	13.533	14.640	13.473	14.700
20 MHz	QPSK	17.884	19.200	17.964	19.280	17.964	19.440
	16QAM	17.964	19.280	17.884	19.360	17.884	19.360

**LTE Band 41**

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.491	4.940	4.511	5.060	4.511	5.220
	16QAM	4.511	5.100	4.511	5.080	4.511	5.180
10 MHz	QPSK	8.942	9.680	8.942	9.800	8.942	9.560
	16QAM	8.942	9.520	8.942	9.520	8.942	9.800
15 MHz	QPSK	13.533	15.480	13.533	15.600	13.473	14.640
	16QAM	13.533	15.240	13.473	14.820	13.473	15.420
20 MHz	QPSK	18.044	24.560	17.884	19.120	17.964	20.240
	16QAM	17.964	19.360	17.964	20.400	17.884	19.120

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

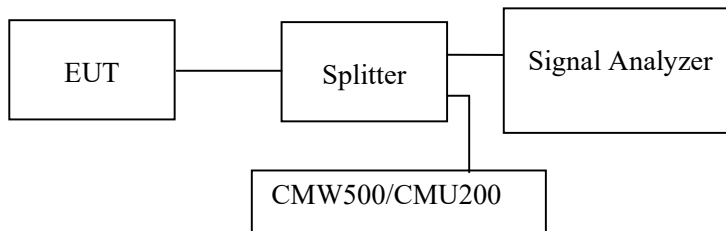
### Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a) and §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<sup>th</sup> harmonic.



### Test Data

#### Environmental Conditions

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Ting Lv from 2021-09-16 to 2021-10-20.*

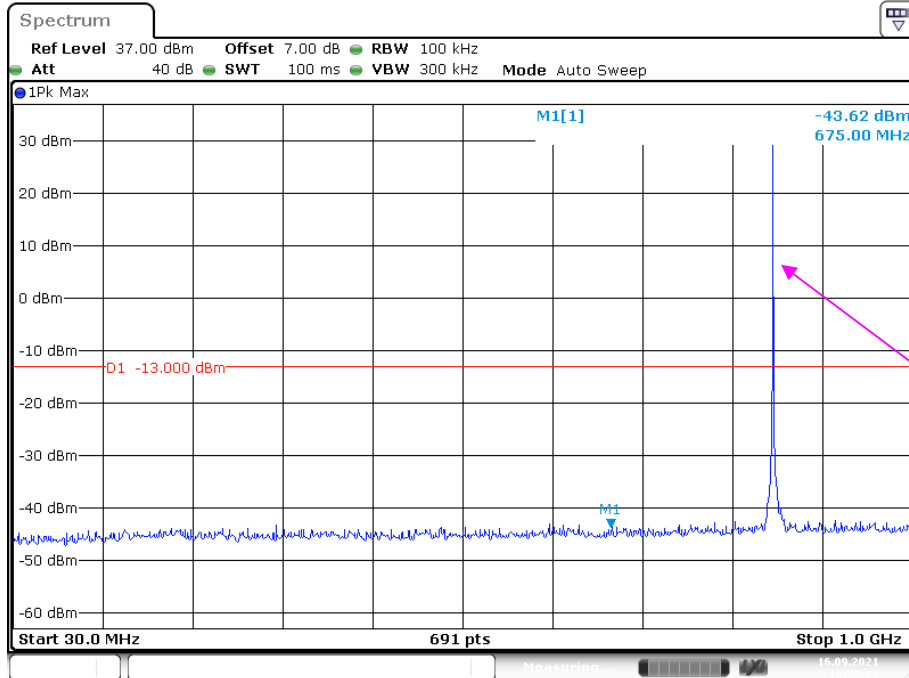
*EUT operation mode: Transmitting*

**Test result: Pass**

*Please refer to the following plots.*

**Cellular Band (Part 22H)  
Low Channel:**

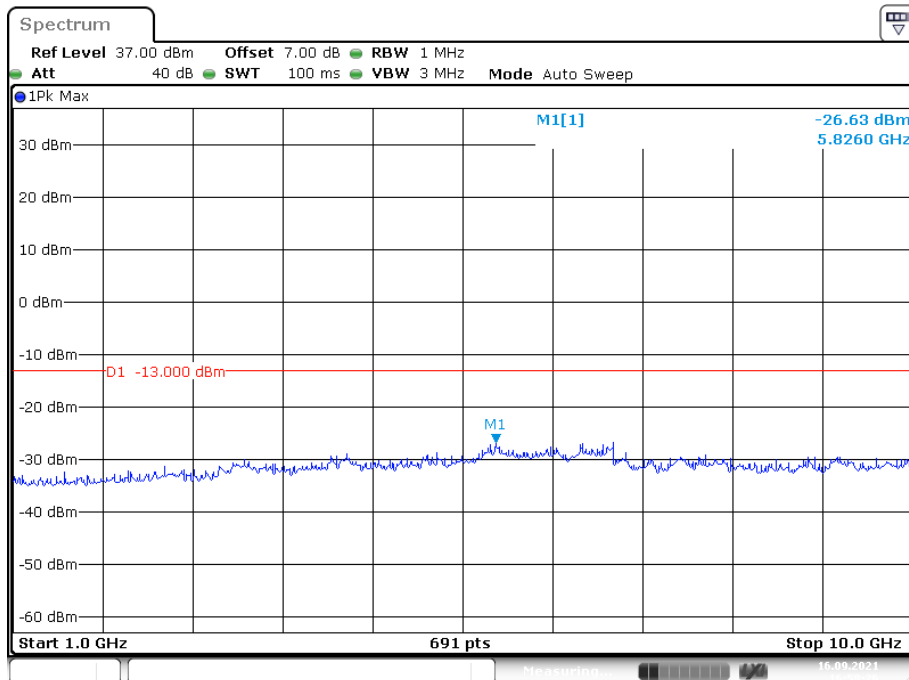
**30 MHz – 1 GHz (GSM Mode)**



Fundamental test

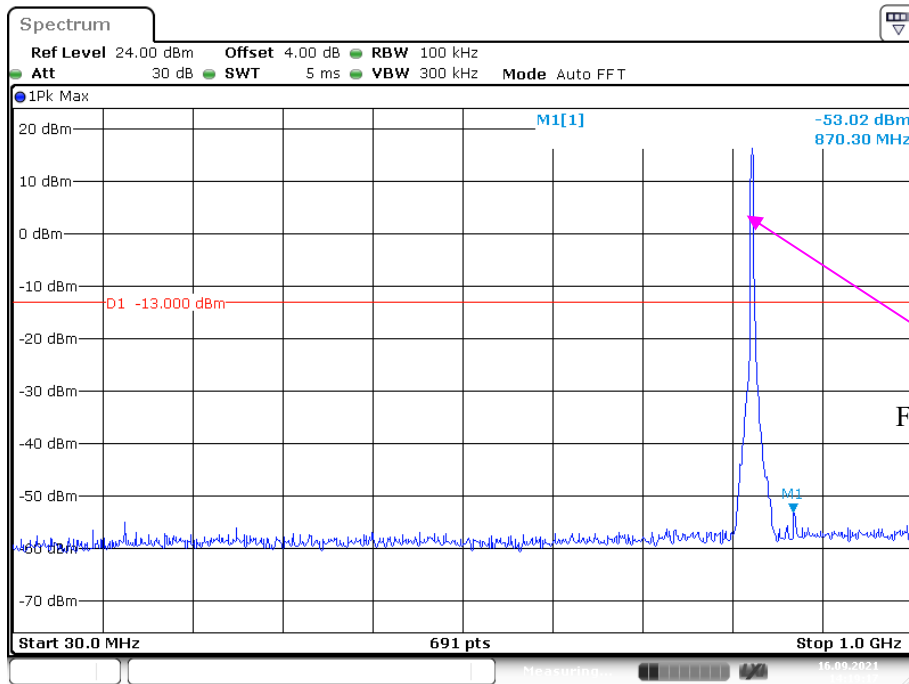
Date: 16.SEP.2021 16:56:21

**1 GHz – 10 GHz (GSM Mode)**

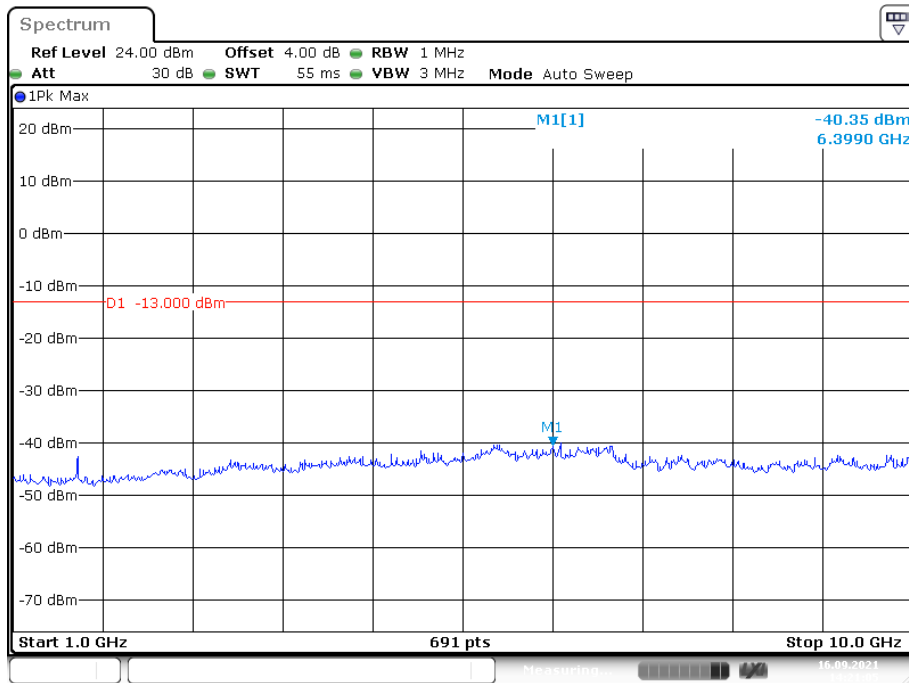


Date: 16.SEP.2021 16:58:26

### 30 MHz – 1 GHz (WCDMA Mode)

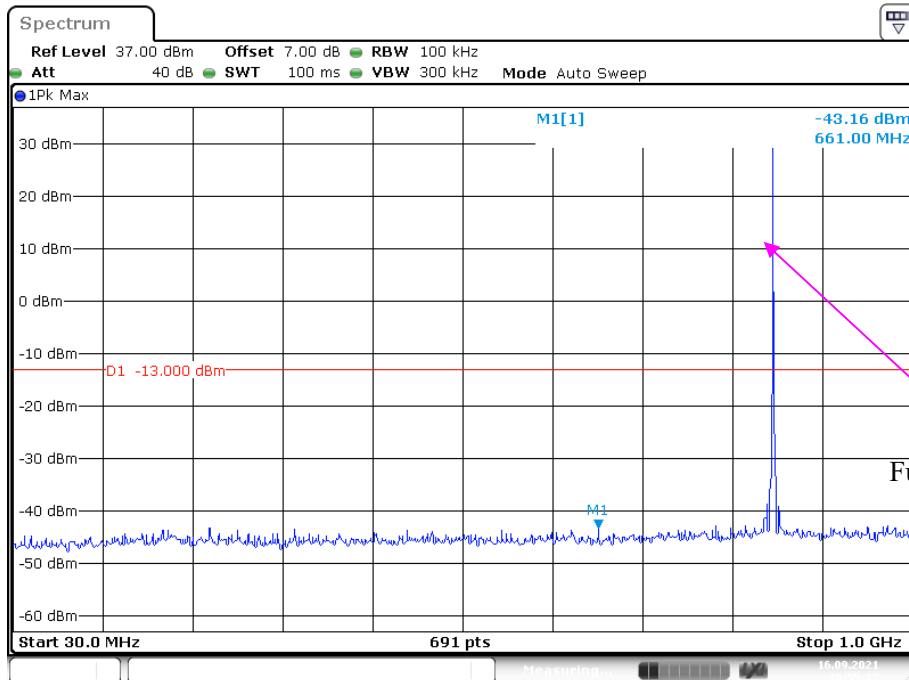


### 1 GHz – 10 GHz (WCDMA Mode)



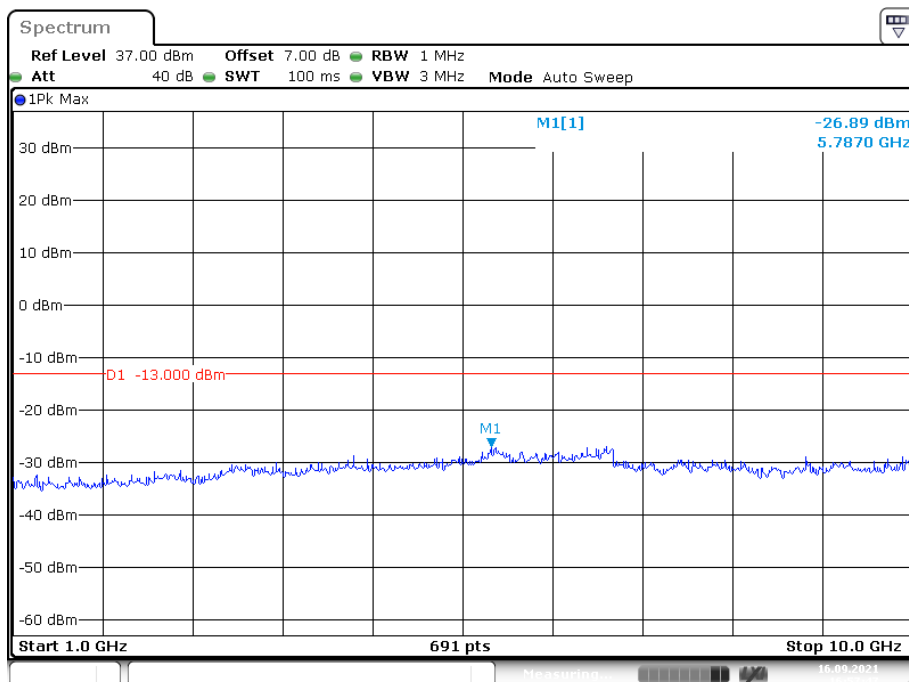
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



Date: 16.SEP.2021 16:55:12

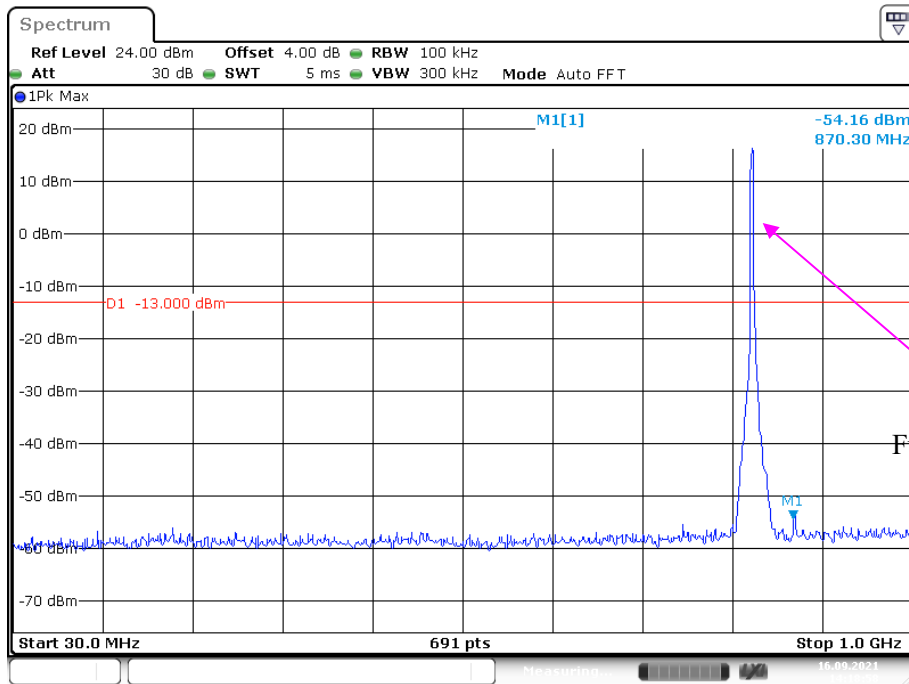
1 GHz – 10 GHz (GSM Mode)



Date: 16.SEP.2021 16:57:47

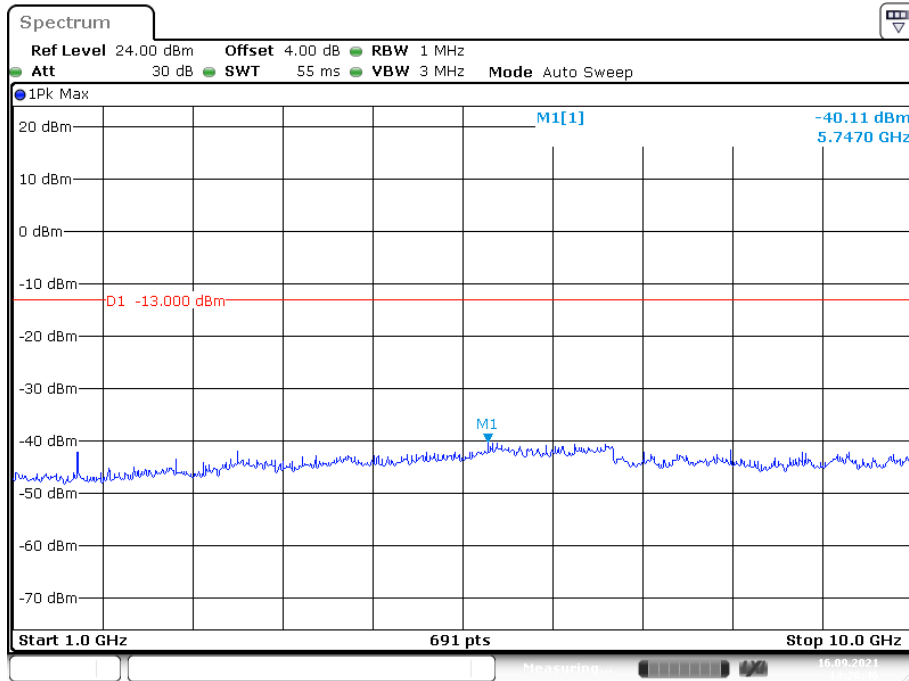


### 30 MHz – 1 GHz (WCDMA Mode)



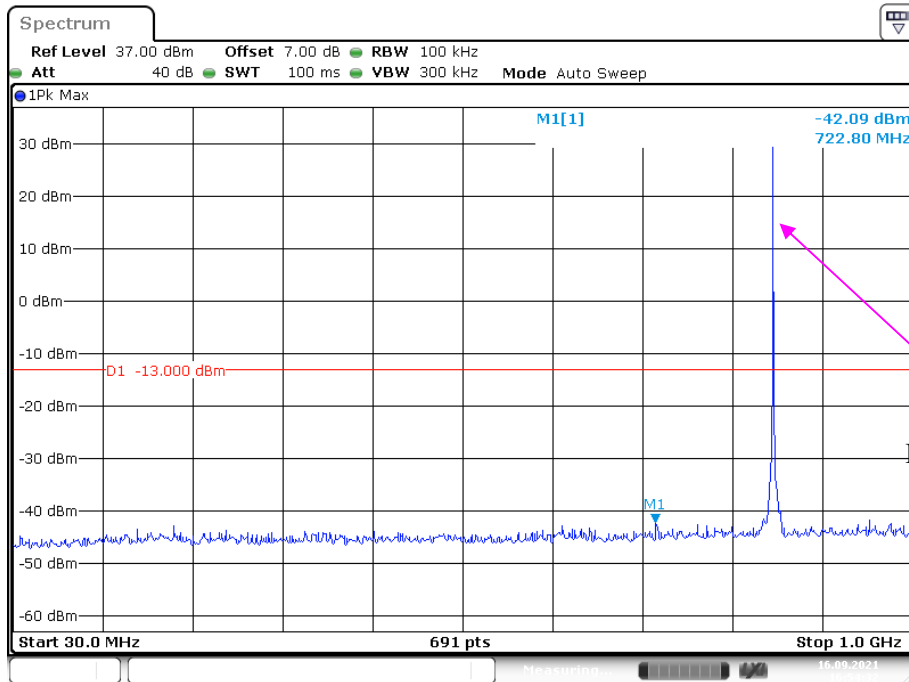
Fundamental test

### 1 GHz – 10 GHz (WCDMA Mode)



**High Channel:**

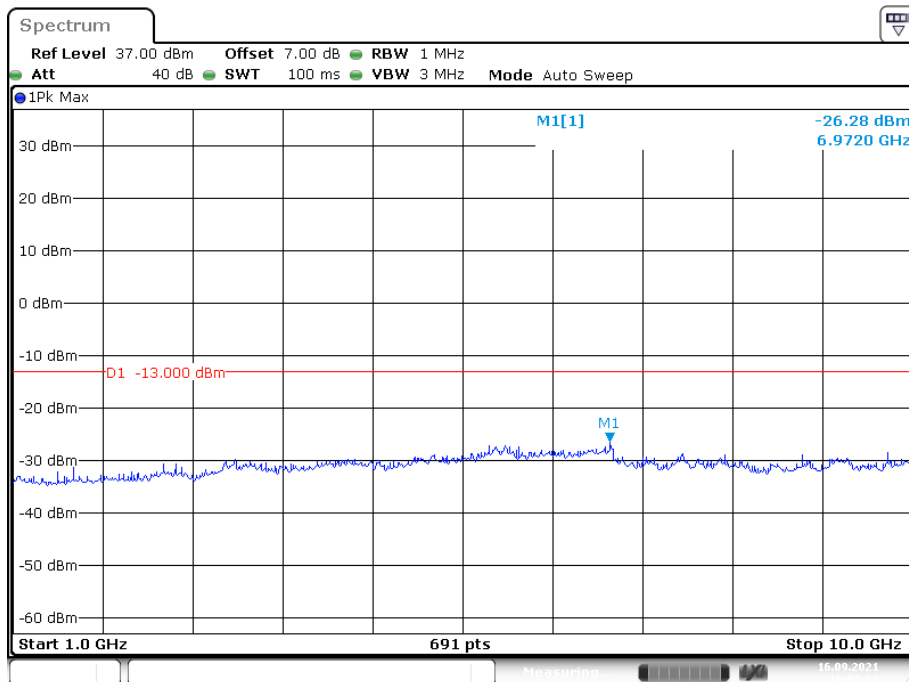
**30 MHz – 1 GHz (GSM Mode)**



Fundamental test

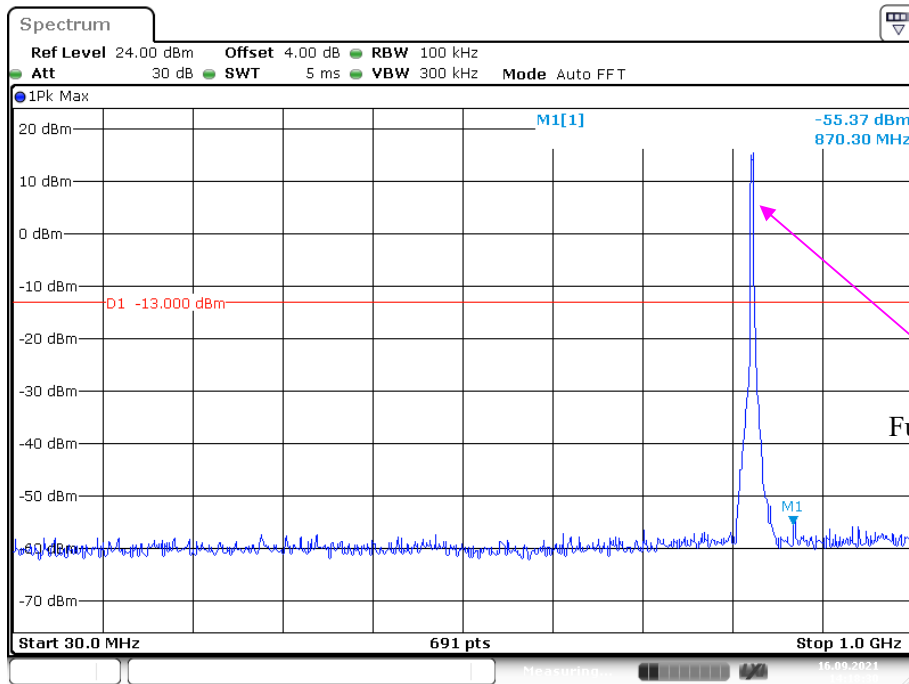
Date: 16.SEP.2021 16:54:32

**1 GHz – 10 GHz (GSM Mode)**



Date: 16.SEP.2021 16:57:23

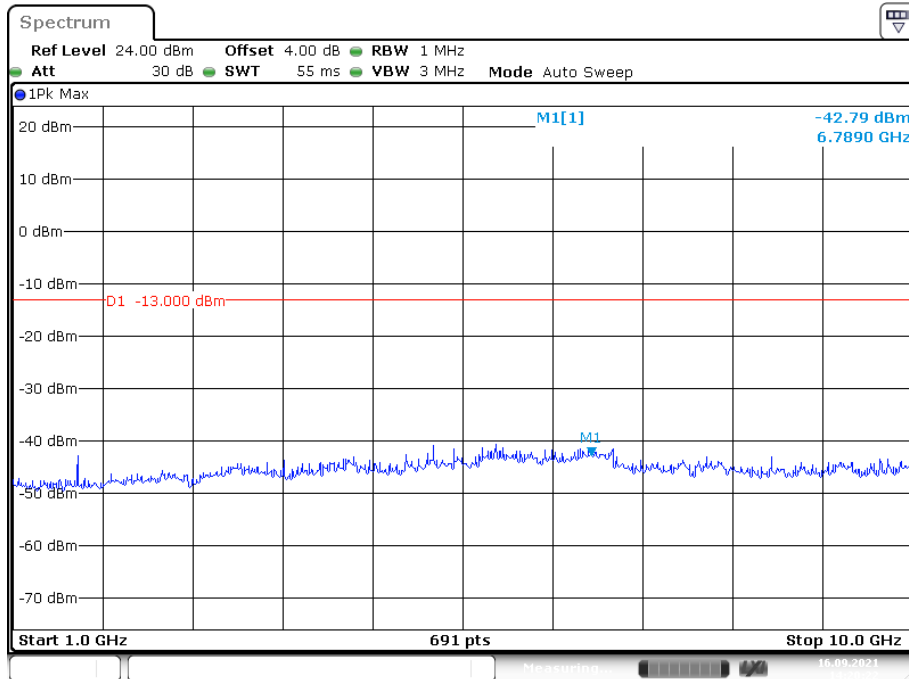
### 30 MHz – 1 GHz (WCDMA Mode)



Date: 16.SEP.2021 14:18:30

Fundamental test

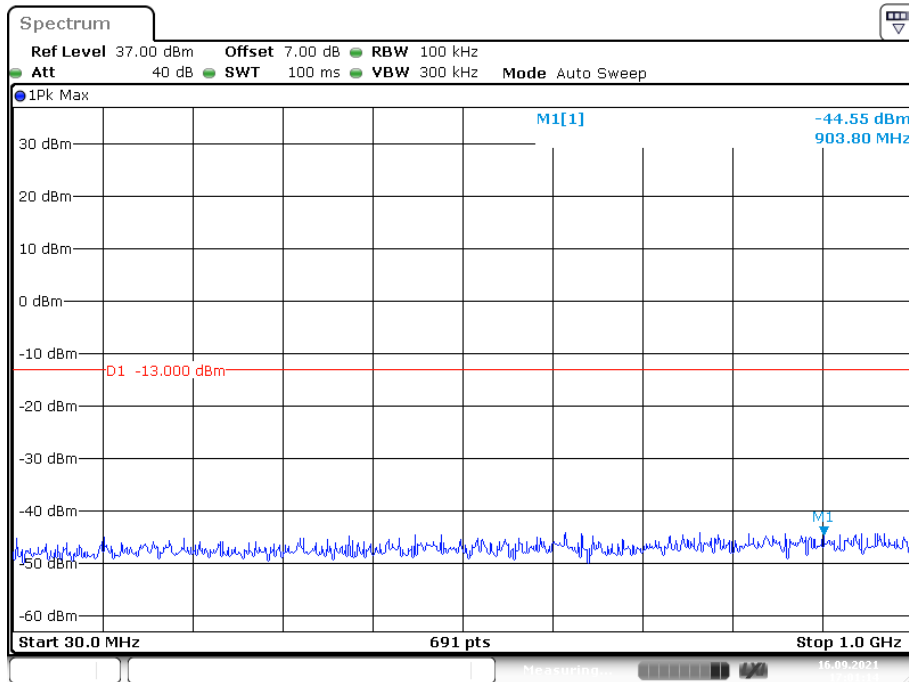
### 1 GHz – 10 GHz (WCDMA Mode)



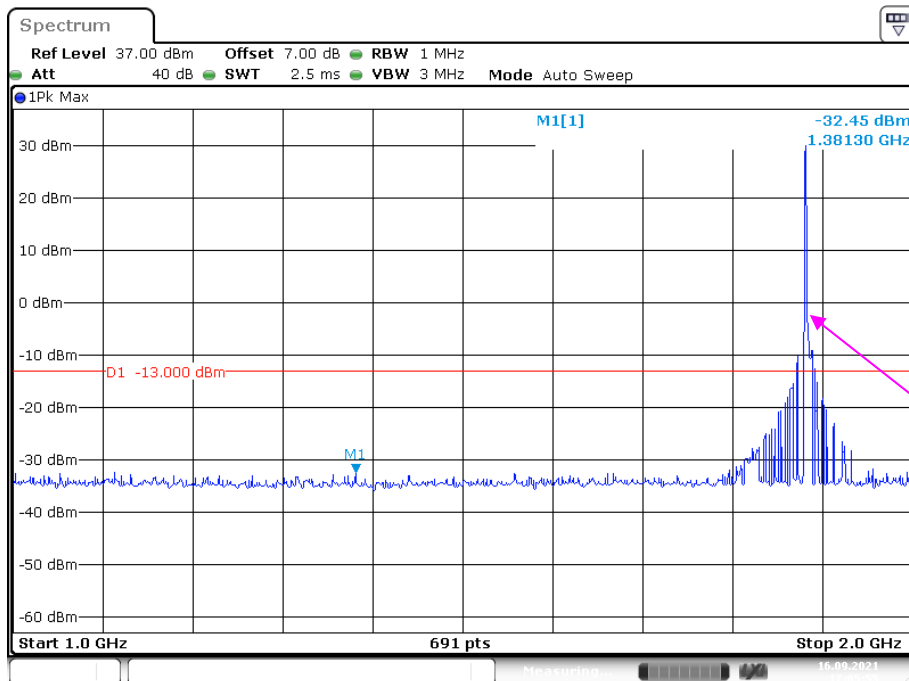
Date: 16.SEP.2021 14:20:22

**PCS Band (Part 24E) Low Channel:**

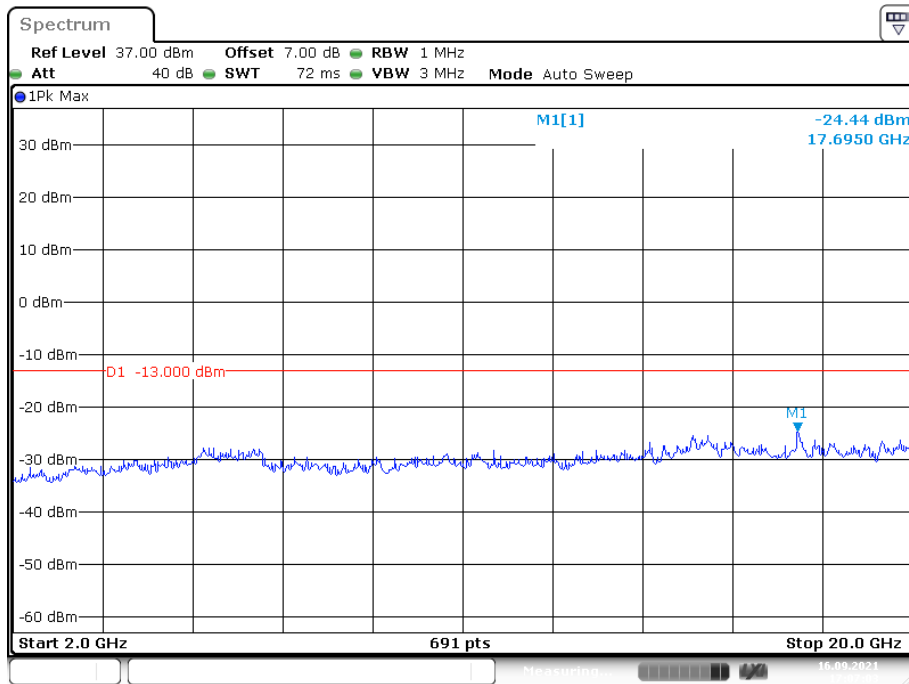
**30 MHz – 1 GHz (GSM Mode)**



**1 GHz – 2 GHz (GSM Mode)**

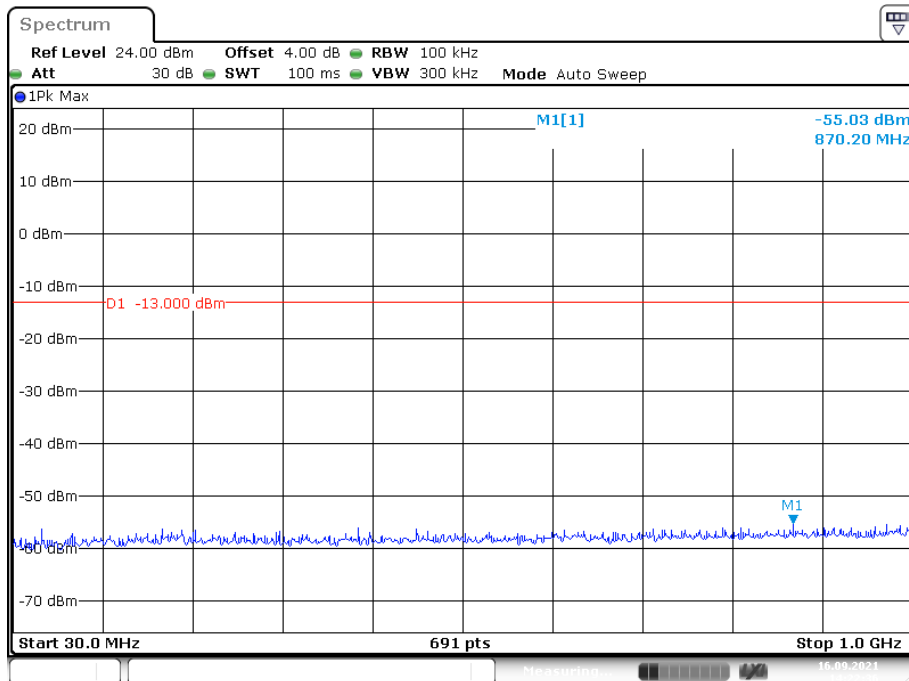


### 2 GHz – 20 GHz (GSM Mode)



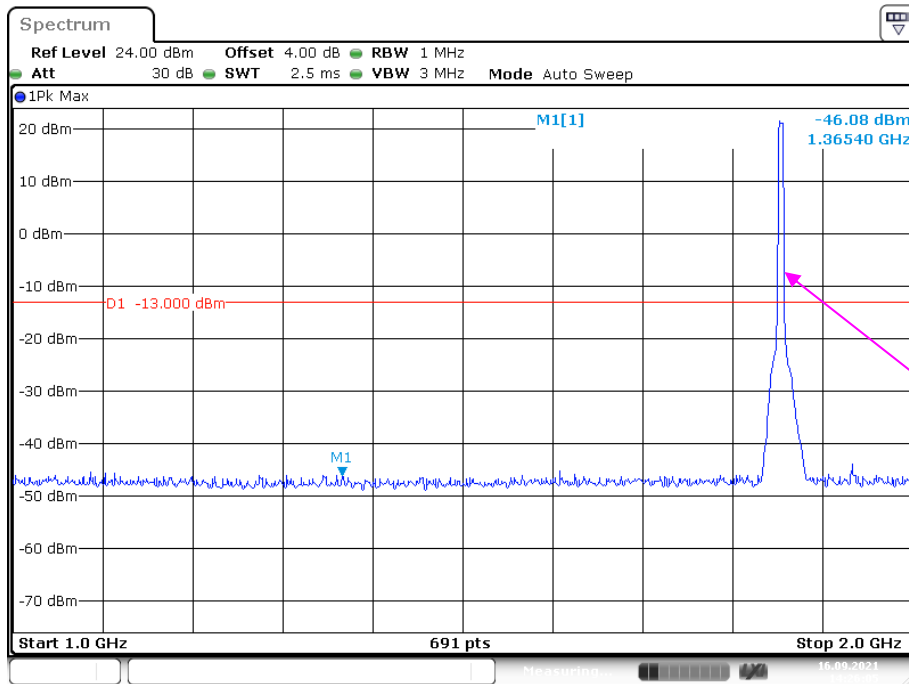
Date: 16.SEP.2021 17:07:03

### 30 MHz – 1 GHz (WCDMA Mode)



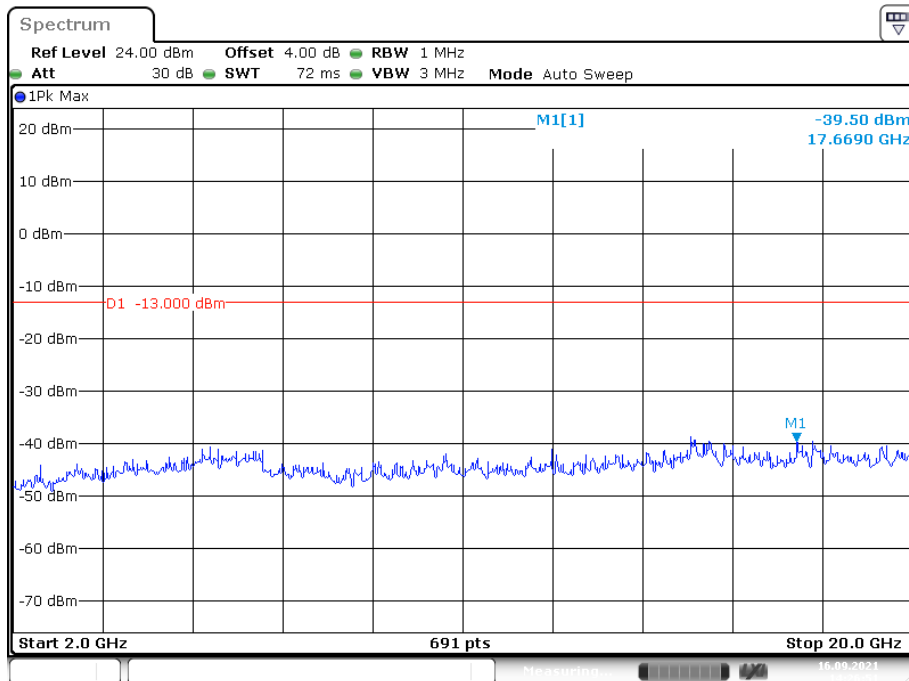
Date: 16.SEP.2021 14:22:36

### 1 GHz – 2 GHz (WCDMA Mode)



Date: 16.SEP.2021 14:26:05

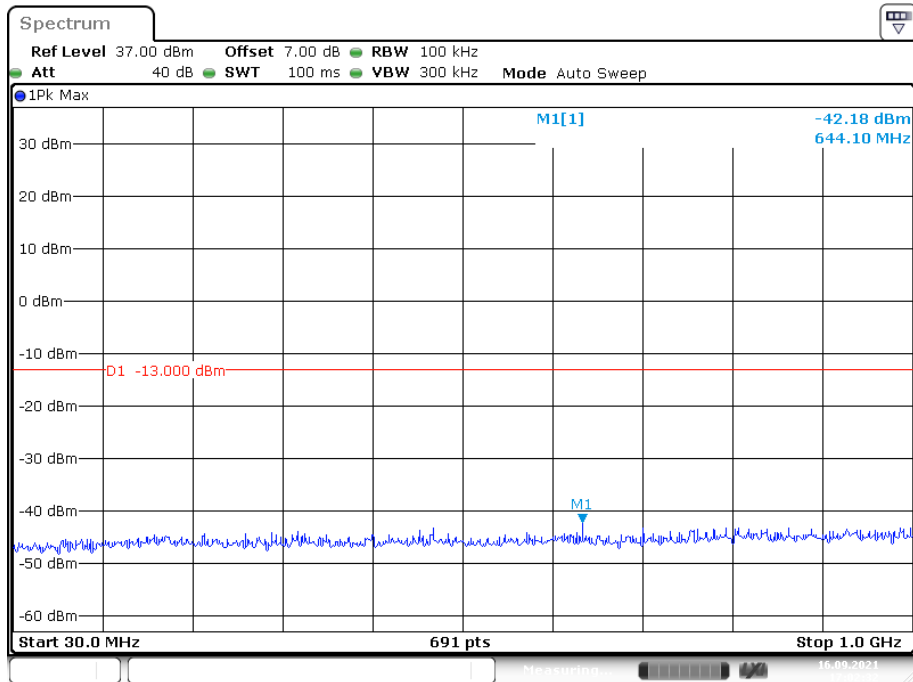
### 2 GHz – 20 GHz (WCDMA Mode)



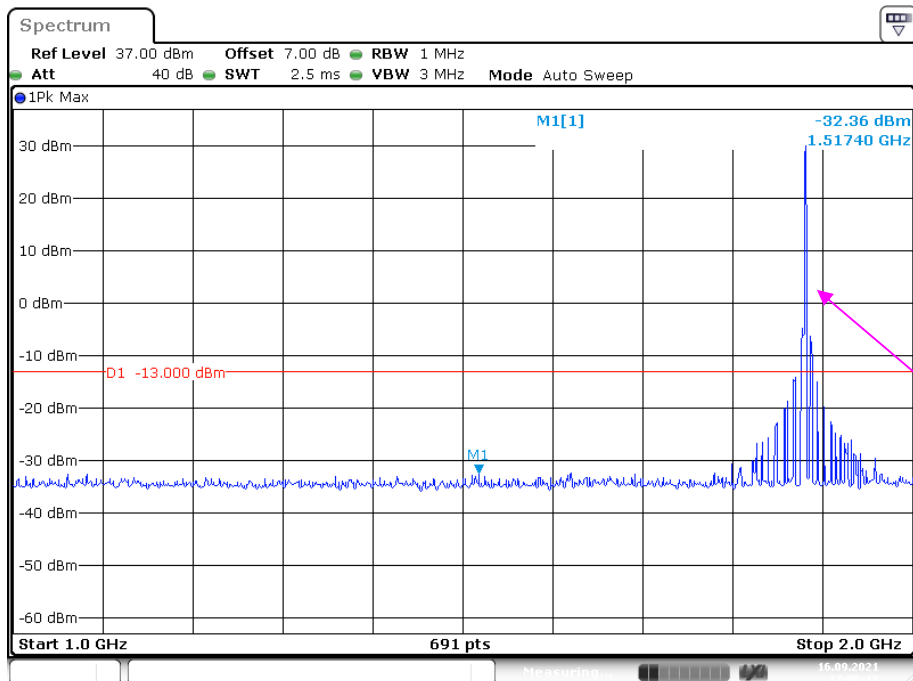
Date: 16.SEP.2021 14:26:51

Middle Channel:

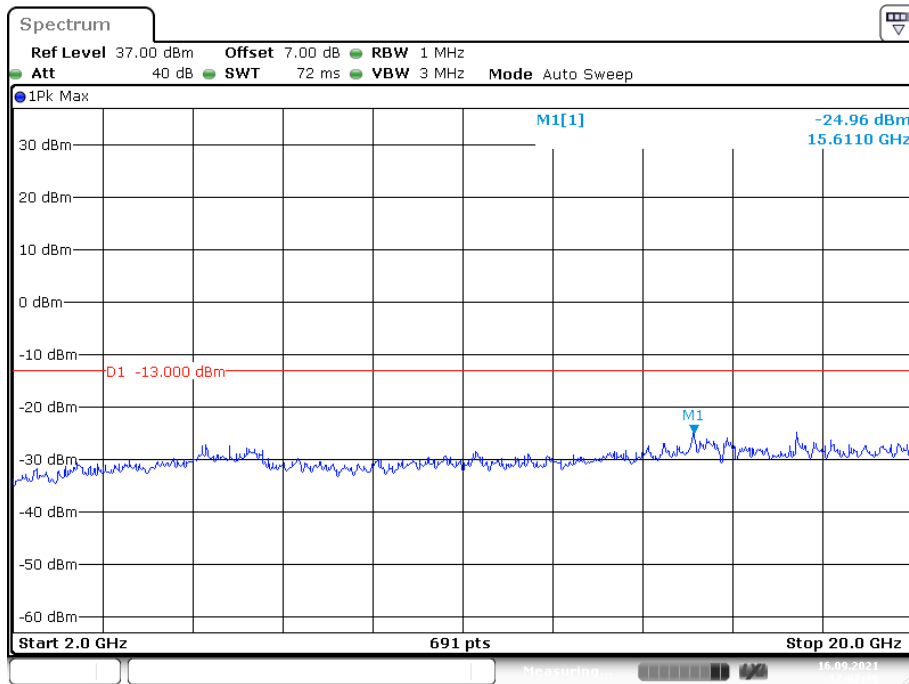
30 MHz – 1 GHz (GSM Mode)



1 GHz – 2 GHz (GSM Mode)

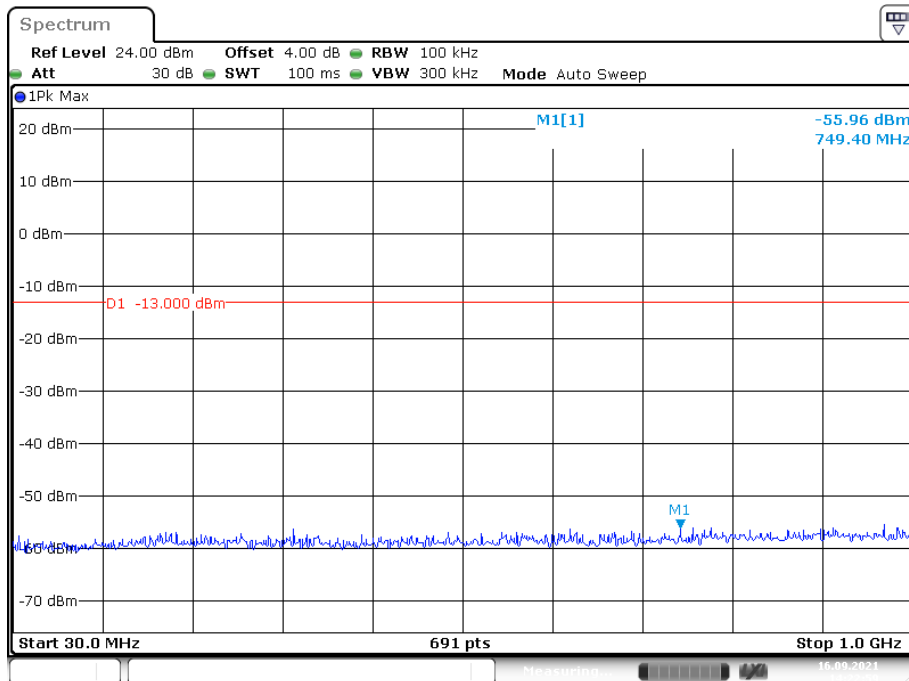


### 2 GHz – 20 GHz (GSM Mode)



Date: 16.SEP.2021 17:07:36

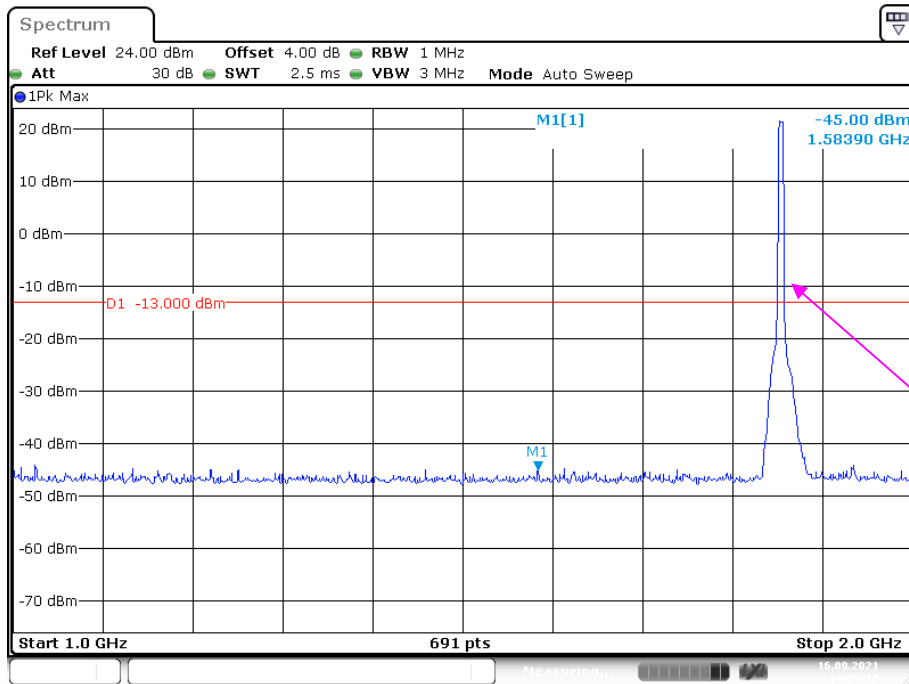
### 30 MHz – 1 GHz (WCDMA Mode)



Date: 16.SEP.2021 14:22:59



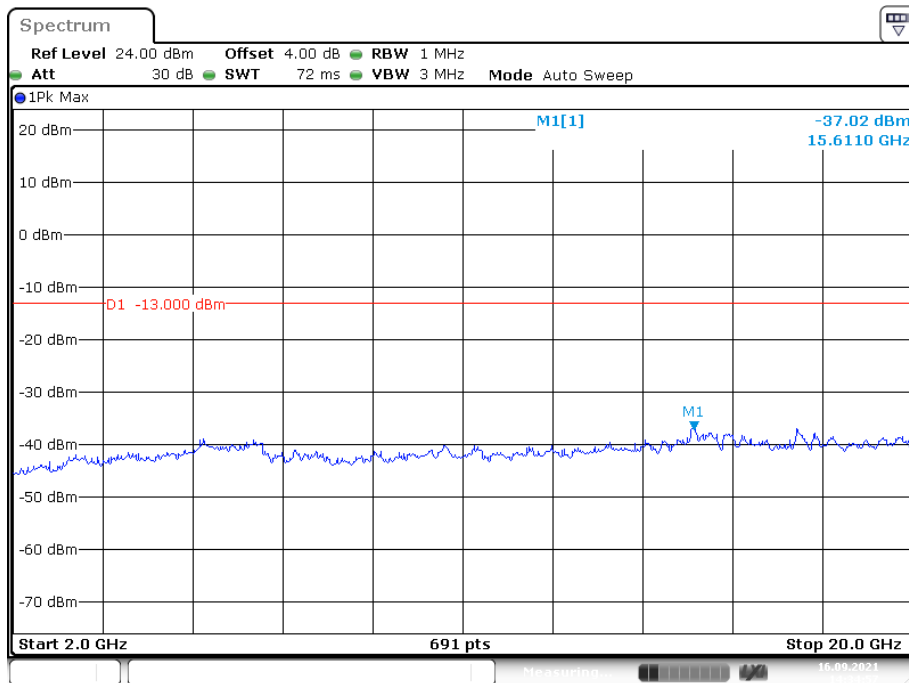
### 1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 16.SEP.2021 14:25:37

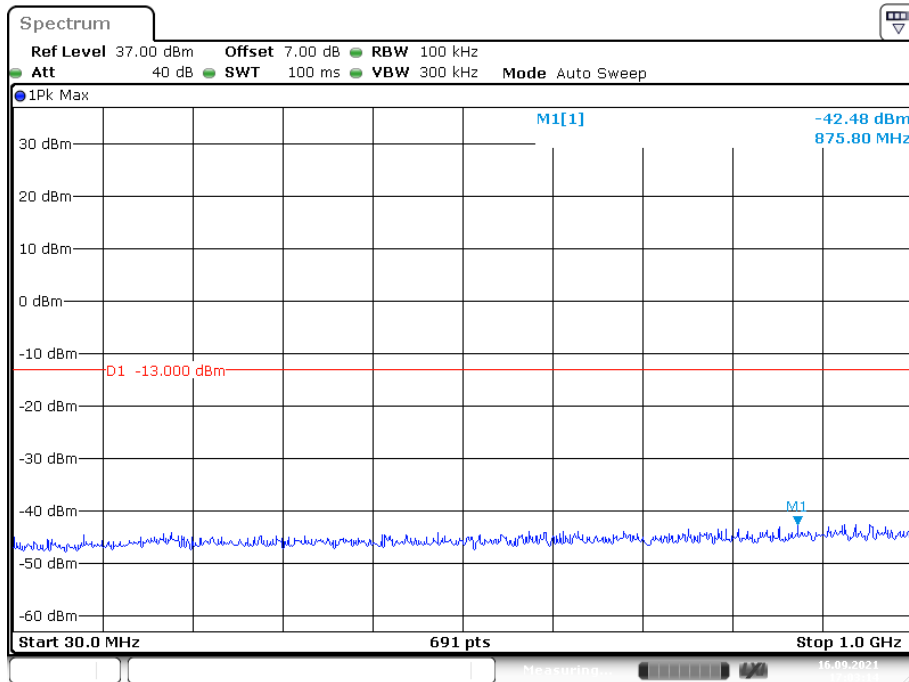
### 2 GHz – 20 GHz (WCDMA Mode)



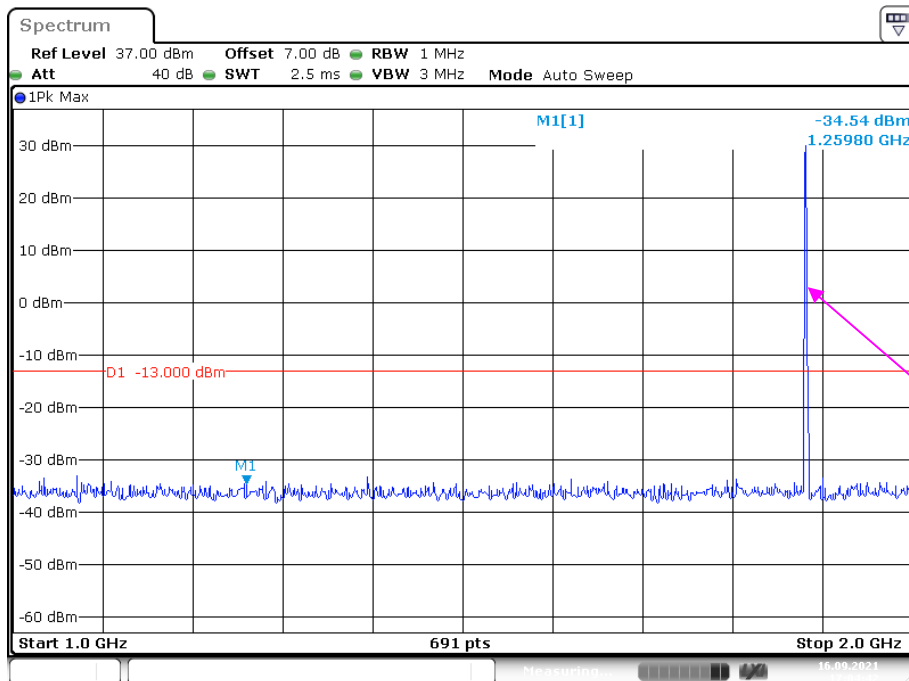
Date: 16.SEP.2021 14:34:57

**High Channel:**

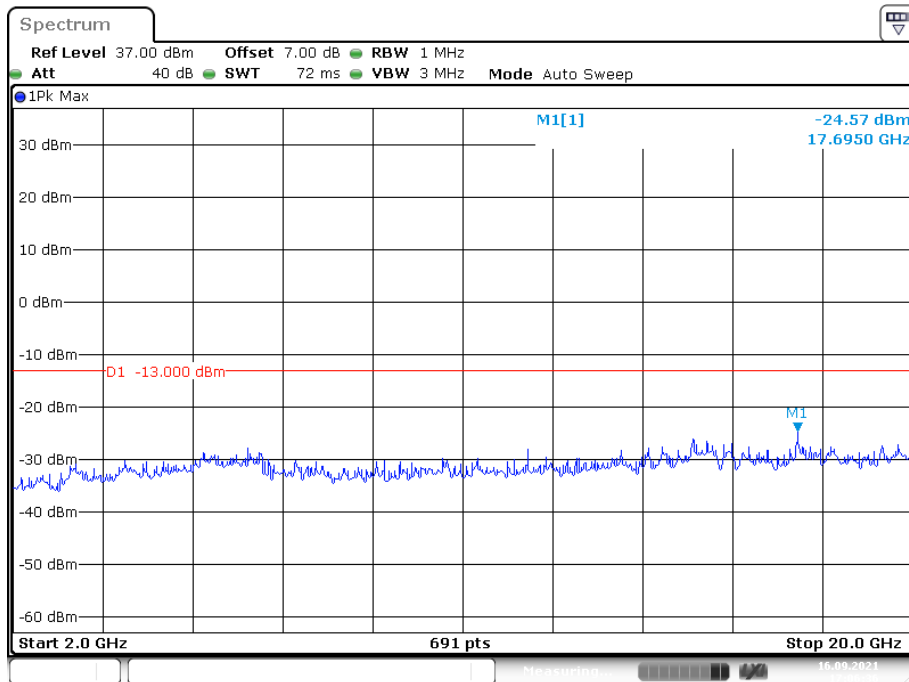
**30 MHz – 1 GHz (GSM Mode)**



**1 GHz – 2 GHz (GSM Mode)**

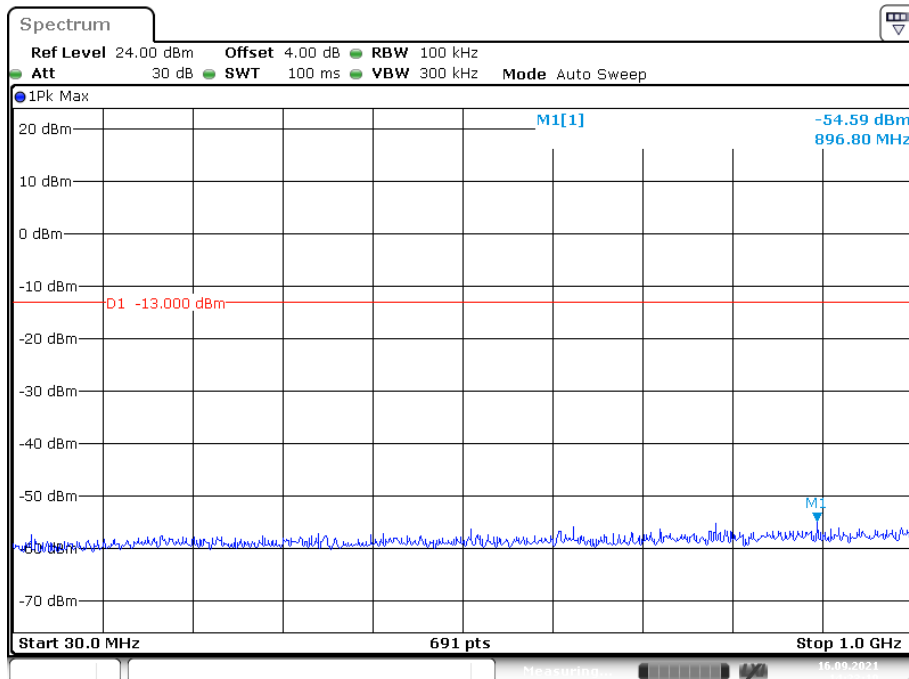


### 2 GHz – 20 GHz (GSM Mode)



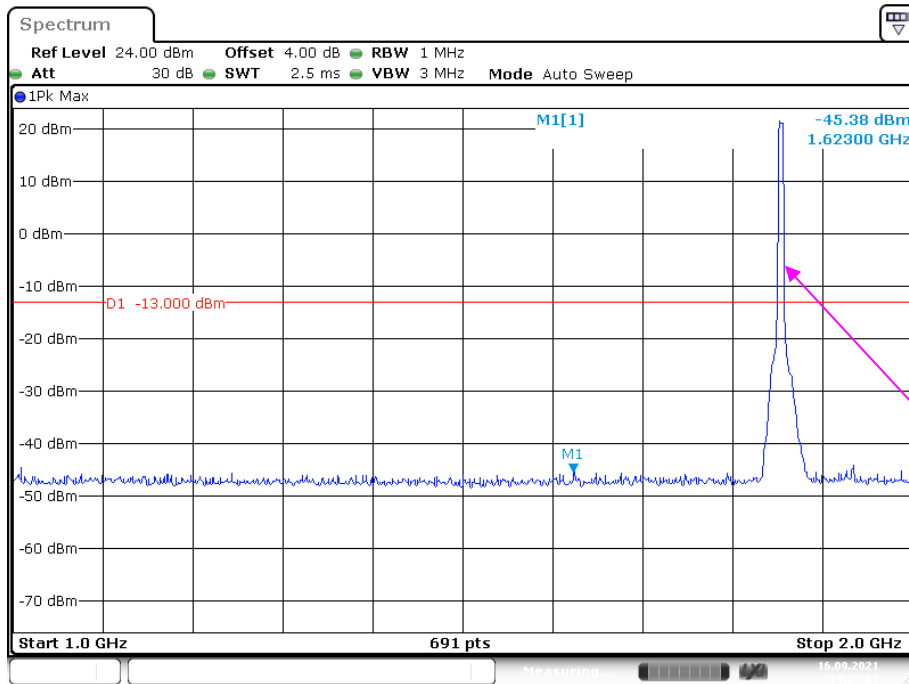
Date: 16.SEP.2021 17:06:36

### 30 MHz – 1 GHz (WCDMA Mode)



Date: 16.SEP.2021 14:23:19

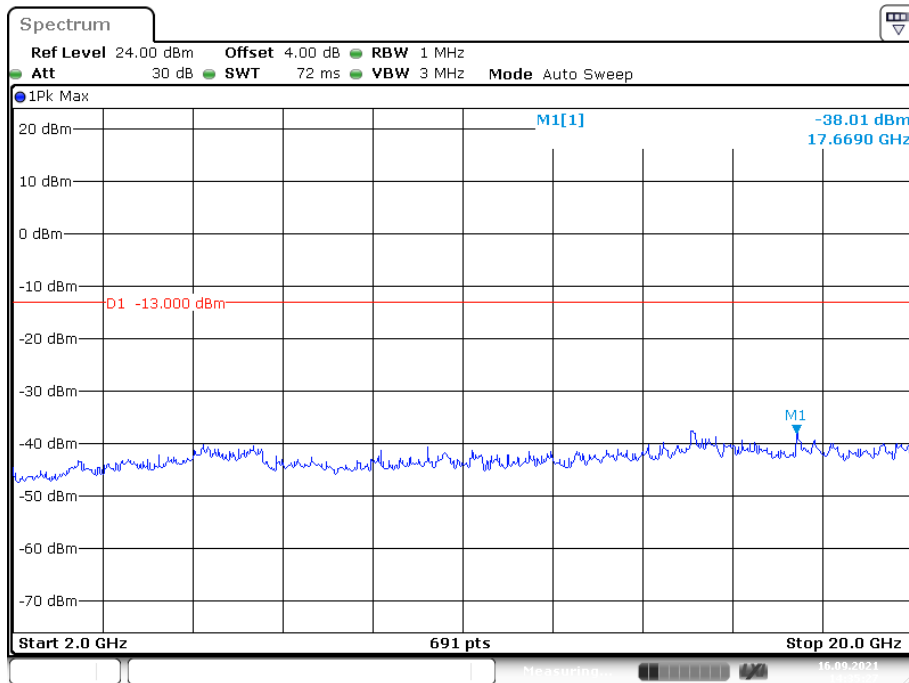
### 1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 16.SEP.2021 14:25:03

### 2 GHz – 20 GHz (WCDMA Mode)



Date: 16.SEP.2021 14:35:27

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

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

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**Applicable Standard**

FCC § 2.1053, § 22.917(a) and § 24.238(a) and § 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**

<b>Temperature:</b>	27~28.6 °C
<b>Relative Humidity:</b>	54~56 %
<b>ATM Pressure:</b>	100.9~101.0 kPa

*The testing was performed by Caro Hu on 2021-09-07 for below 1GHz on 2021-10-24 for above 1GHz.*

*EUT operation mode: Transmitting*

**30 MHz ~ 10 GHz:****Cellular Band (Part 22H)**

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)			Limit (dBm)	Margin (dB)
GSM Mode								
Low Channel								
442.6	-70.79	62	2.0	H	2.89	-67.9	-13	54.9
384.1	-71.87	218	1.6	V	3.86	-68.01	-13	55.01
1648.4	-46.58	25	2.0	H	-2.32	-48.9	-13	35.9
1648.4	-38.41	86	1.9	V	-2.29	-40.7	-13	27.7
2472.6	-49.86	180	1.9	H	1.16	-48.7	-13	35.7
2472.6	-48.29	288	2.0	V	1.09	-47.2	-13	34.2
3296.8	-48.15	52	1.8	H	3.25	-44.9	-13	31.9
3296.8	-47.36	239	2.0	V	3.16	-44.2	-13	31.2
Middle Channel								
442.3	-71.23	157	1.5	H	2.89	-68.34	-13	55.34
384.1	-72.9	313	2.0	V	3.86	-69.04	-13	56.04
1673.2	-35.82	208	1.8	H	-2.38	-38.2	-13	25.2
1673.2	-34.69	320	1.8	V	-2.31	-37	-13	24
2509.8	-48.44	216	1.7	H	1.34	-47.1	-13	34.1
2509.8	-46.17	210	2.1	V	1.37	-44.8	-13	31.8
3346.4	-47.22	172	1.7	H	3.32	-43.9	-13	30.9
3346.4	-45.34	306	1.6	V	3.24	-42.1	-13	29.1
High Channel								
442.3	-70.74	146	2.1	H	2.89	-67.85	-13	54.85
384.1	-72.54	154	1.8	V	3.86	-68.68	-13	55.68
1697.6	-42.32	291	1.6	H	-2.38	-44.7	-13	31.7
1697.6	-37.76	89	1.7	V	-2.34	-40.1	-13	27.1
2546.4	-47.28	283	1.5	H	1.38	-45.9	-13	32.9
2546.4	-46.52	291	1.5	V	1.42	-45.1	-13	32.1
3395.2	-48.92	352	1.5	H	6.32	-42.6	-13	29.6
3395.2	-49.81	65	1.6	V	6.21	-43.6	-13	30.6

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)			Limit (dBm)	Margin (dB)
WCDMA Mode								
Low Channel								
442.62	-71.64	67	1.5	H	2.9	-68.74	-13	55.74
384.71	-73.35	229	1.8	V	3.86	-69.49	-13	56.49
1652.8	-52.28	79	2.1	H	-2.32	-54.6	-13	41.6
1652.8	-51.38	16	2.0	V	-2.32	-53.7	-13	40.7
2479.2	-37.71	235	1.9	H	1.21	-36.5	-13	23.5
2479.2	-39.94	22	1.5	V	1.24	-38.7	-13	25.7
Middle Channel								
442.62	-70.34	72	1.8	H	2.9	-67.44	-13	54.44
384.71	-72.87	317	1.8	V	3.86	-69.01	-13	56.01
1673.2	-48.06	91	2.0	H	-2.34	-50.4	-13	37.4
1673.2	-50.49	254	1.7	V	-2.31	-52.8	-13	39.8
2509.8	-51.55	137	2.0	H	1.35	-50.2	-13	37.2
2509.8	-50.39	221	1.7	V	1.39	-49	-13	36
High Channel								
442.62	-70.84	139	2.1	H	2.9	-67.94	-13	54.94
384.71	-72.68	104	2.0	V	3.86	-68.82	-13	55.82
1693.2	-51.92	43	1.9	H	-2.38	-54.3	-13	41.3
1693.2	-51.16	9	1.8	V	-2.34	-53.5	-13	40.5
2539.8	-52.24	216	1.6	H	1.44	-50.8	-13	37.8
2539.8	-52.38	16	1.7	V	1.48	-50.9	-13	37.9

**30 MHz ~ 20 GHz:****PCS Band (Part 24E)**

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)			Limit (dBm)	Margin (dB)
GSM Mode								
Low Channel								
442.3	-71.25	203	1.5	H	2.89	-68.36	-13	55.36
384.1	-73	224	1.9	V	3.86	-69.14	-13	56.14
3700.4	-50.02	222	1.7	H	4.72	-45.3	-13	32.3
3700.4	-47.41	51	1.9	V	4.61	-42.8	-13	29.8
Middle Channel								
442.3	-70.1	249	1.9	H	2.89	-67.21	-13	54.21
384.1	-72.75	358	1.9	V	3.86	-68.89	-13	55.89
3760	-50.04	264	1.6	H	4.94	-45.1	-13	32.1
3760	-48.35	94	2.0	V	4.85	-43.5	-13	30.5
High Channel								
442.3	-71.22	252	1.8	H	2.89	-68.33	-13	55.33
384.1	-72.83	187	1.6	V	3.86	-68.97	-13	55.97
3819.6	-50.95	208	1.8	H	5.25	-45.7	-13	32.7
3819.6	-49.18	197	1.9	V	5.08	-44.1	-13	31.1



Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)			Limit (dBm)	Margin (dB)
WCDMA Mode								
Low Channel								
442.74	-71.31	9	1.6	H	2.9	-68.41	-13	55.41
384.51	-73.18	189	1.9	V	3.86	-69.32	-13	56.32
3704.8	-52.65	103	1.5	H	4.75	-47.9	-13	34.9
3704.8	-51.72	117	1.9	V	4.62	-47.1	-13	34.1
5557.2	-55.55	247	1.8	H	10.65	-44.9	-13	31.9
5557.2	-53.62	154	1.9	V	9.32	-44.3	-13	31.3
Middle Channel								
442.74	-70.75	4	1.8	H	2.9	-67.85	-13	54.85
384.51	-72.65	313	1.6	V	3.86	-68.79	-13	55.79
3760	-53.04	56	1.8	H	4.94	-48.1	-13	35.1
3760	-52.25	284	1.7	V	4.85	-47.4	-13	34.4
5640	-56.18	86	1.8	H	10.68	-45.5	-13	32.5
5640	-55.09	113	1.7	V	10.29	-44.8	-13	31.8
High Channel								
442.74	-70.52	140	1.6	H	2.9	-67.62	-13	54.62
384.51	-72.73	154	2.0	V	3.86	-68.87	-13	55.87
3815.2	-53.52	351	1.6	H	5.22	-48.3	-13	35.3
3815.2	-52.45	124	2.0	V	5.05	-47.4	-13	34.4
5722.8	-56.55	269	1.9	H	10.75	-45.8	-13	32.8
5722.8	-56.55	241	2.0	V	11.85	-44.7	-13	31.7

**LTE Band:** (Pre-scan with all the bandwidth, 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: 30 MHz ~ 20 GHz								
1.4MHz, Low channel								
442.42	-70.52	194	1.9	H	2.9	-67.62	-13	54.62
384.63	-72.82	243	1.8	V	3.86	-68.96	-13	55.96
3701.4	-52.12	158	1.8	H	4.72	-47.40	-13	34.40
3701.4	-51.21	153	1.6	V	4.61	-46.60	-13	33.60
5552.1	-53.24	242	1.7	H	10.24	-43.00	-13	30.00
5552.1	-47.56	5	1.7	V	9.26	-38.30	-13	25.30
1.4MHz, Middle channel								
442.42	-71.26	300	1.9	H	2.9	-68.36	-13	55.36
384.63	-72.84	354	1.7	V	3.86	-68.98	-13	55.98
3760	-52.94	116	2.0	H	4.94	-48.00	-13	35.00
3760	-51.85	105	1.6	V	4.85	-47.00	-13	34.00
5640	-53.08	234	1.7	H	10.68	-42.40	-13	29.40
5640	-47.49	279	1.6	V	10.29	-37.20	-13	24.20
1.4MHz, High Channel								
442.42	-71.22	148	1.9	H	2.9	-68.32	-13	55.32
384.63	-73.64	109	1.6	V	3.86	-69.78	-13	56.78
3818.6	-53.15	149	1.5	H	5.25	-47.90	-13	34.90
3818.6	-52.28	86	1.7	V	5.08	-47.20	-13	34.20
5727.9	-54.32	122	1.9	H	11.32	-43.00	-13	30.00
5727.9	-48.52	338	2.0	V	10.72	-37.80	-13	24.80
Band 5								
Test frequency range:30 MHz ~ 20 GHz								
1.4MHz, Low channel								
442.42	-70.86	181	2.0	H	2.9	-67.96	-13	54.96
384.63	-72.87	138	2.0	V	3.86	-69.01	-13	56.01
1649.4	-54.01	325	1.9	H	-2.79	-56.80	-13	43.80
1649.4	-53.47	193	1.8	V	-2.73	-56.20	-13	43.20
2474.1	-45.09	349	1.7	H	1.19	-43.90	-13	30.90
2474.1	-46.21	276	1.5	V	1.21	-45.00	-13	32.00
1.4MHz, Middle channel								
442.42	-70.11	40	1.7	H	2.9	-67.21	-13	54.21
384.63	-72.6	28	1.8	V	3.86	-68.74	-13	55.74
1673	-52.36	347	2.0	H	-2.74	-55.10	-13	42.10
1673	-49.41	311	1.5	V	-2.69	-52.10	-13	39.10
2509.5	-44.65	180	1.7	H	1.35	-43.30	-13	30.30
2509.5	-46.69	54	1.9	V	1.39	-45.30	-13	32.30

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
1.4MHz, High Channel								
442.42	-70.26	125	1.8	H	2.9	-67.36	-13	54.36
384.63	-72.93	155	2.0	V	3.86	-69.07	-13	56.07
1696.6	-51.3	294	1.9	H	-2.7	-54.00	-13	41.00
1696.6	-50.25	238	1.7	V	-2.65	-52.90	-13	39.90
2544.9	-43.35	30	1.6	H	1.45	-41.90	-13	28.90
2544.9	-45.2	219	1.9	V	1.5	-43.70	-13	30.70
Band 7								
Test frequency range:30 MHz ~ 26.5GHz								
5MHz, Low channel								
442.77	-68.15	249	1.7	H	2.9	-65.25	-25	40.25
384.64	-70.88	298	2.0	V	3.86	-67.02	-25	42.02
5005	-48.54	31	1.8	H	9.54	-39.00	-25	14.0
5005	-48.23	228	2.0	V	8.33	-39.90	-25	14.90
7507.5	-51.68	160	2.0	H	14.38	-37.30	-25	12.30
7507.5	-53.55	118	1.8	V	15.15	-38.40	-25	13.40
5MHz, Middle channel								
442.77	-68.92	49	1.7	H	2.9	-66.02	-25	41.02
384.64	-72.07	89	2.0	V	3.86	-68.21	-25	43.21
5070	-47.07	228	2.1	H	9.67	-37.40	-25	12.40
5070	-47.45	51	2.0	V	8.35	-39.10	-25	14.10
7605	-53.10	262	1.7	H	14.7	-38.40	-25	13.40
7605	-54.38	15	2.0	V	15.38	-39.00	-25	14.00
5MHz, High Channel								
442.77	-69.15	57	1.7	H	2.9	-66.25	-25	41.25
384.64	-71.71	247	2.1	V	3.86	-67.85	-25	42.85
95.43	-64.72	189	1.2	V	-3.32	-68.04	-13	55.04
5135	-48.04	109	1.5	H	9.84	-38.20	-25	13.20
5135	-47.66	208	2.0	V	8.36	-39.30	-25	14.30
7702.5	-54.32	5	1.9	H	15.02	-39.30	-25	14.30
7702.5	-55.72	140	1.9	V	15.62	-40.10	-25	15.10

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Band 41								
Test frequency range: 30 MHz ~ 26.5 GHz								
5MHz, Low channel								
442.71	-68.92	212	1.6	H	2.9	-66.02	-25	41.02
384.59	-71.01	237	1.7	V	3.86	-67.15	-25	42.15
5075	-40.57	266	1.8	H	9.67	-30.90	-25	5.90
5075	-38.55	165	1.6	V	8.35	-30.20	-25	5.20
5MHz, Middle channel								
442.77	-69.37	194	1.9	H	2.9	-66.47	-25	41.47
384.64	-71.97	171	1.8	V	3.86	-68.11	-25	43.11
5190	-39.78	303	1.7	H	9.98	-29.80	-25	4.8
5190	-38.79	133	1.6	V	8.39	-30.40	-25	5.4
5MHz, High Channel								
442.77	-69.64	45	1.5	H	2.9	-66.74	-25	41.74
384.64	-71.88	150	1.9	V	3.86	-68.02	-25	43.02
5305	-40.82	314	2.1	H	10.12	-30.70	-25	5.7
5305	-36.81	351	1.9	V	8.51	-28.30	-25	3.3

**Note:**

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit - Absolute Level

dBd is for the ERP, dBi is for EIRP.

## FCC § 22.917 (a); § 24.238 (a); §27.53(c) (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.

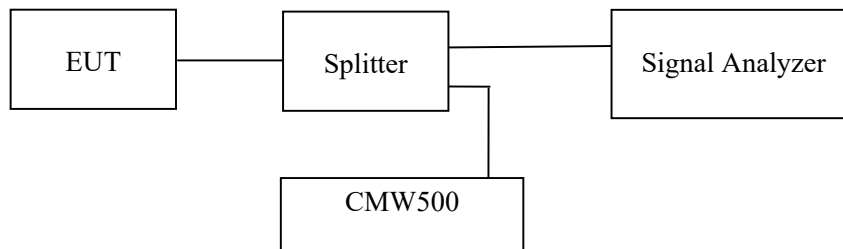
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to FCC §27.53 (c)(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

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

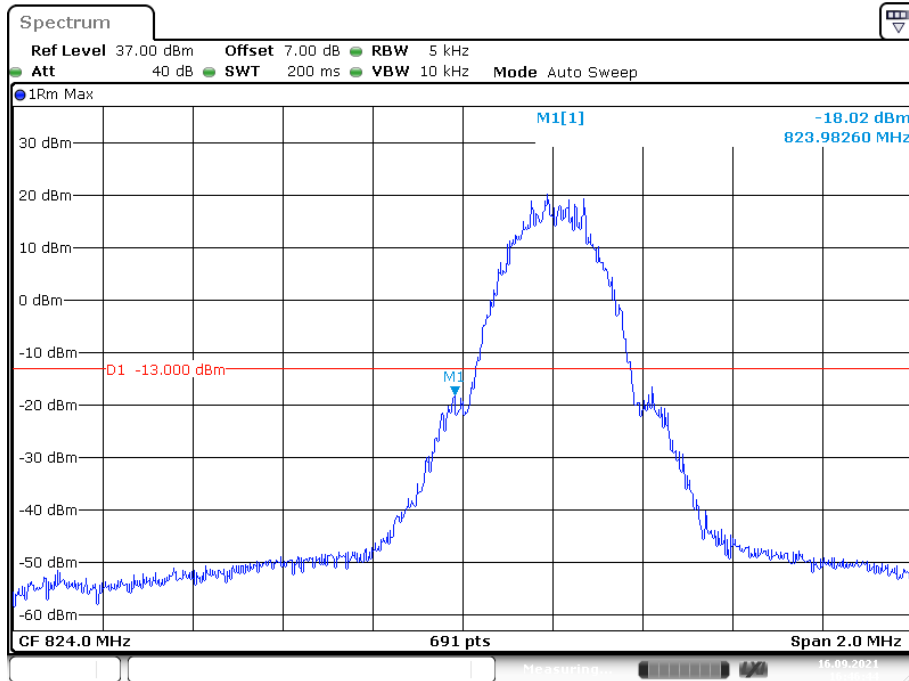
*The testing was performed by Ting Lv from 2021-09-16 to 2021-10-20.*

*EUT operation mode: Transmitting (Worst case)*

**Test Result: Pass**

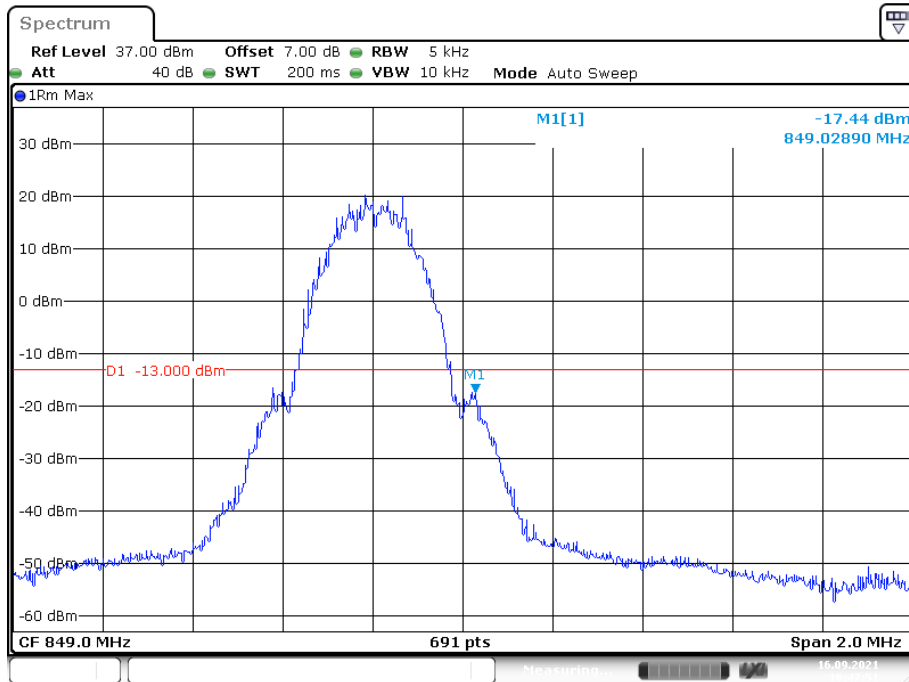
*Please refer to the following plots.*

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



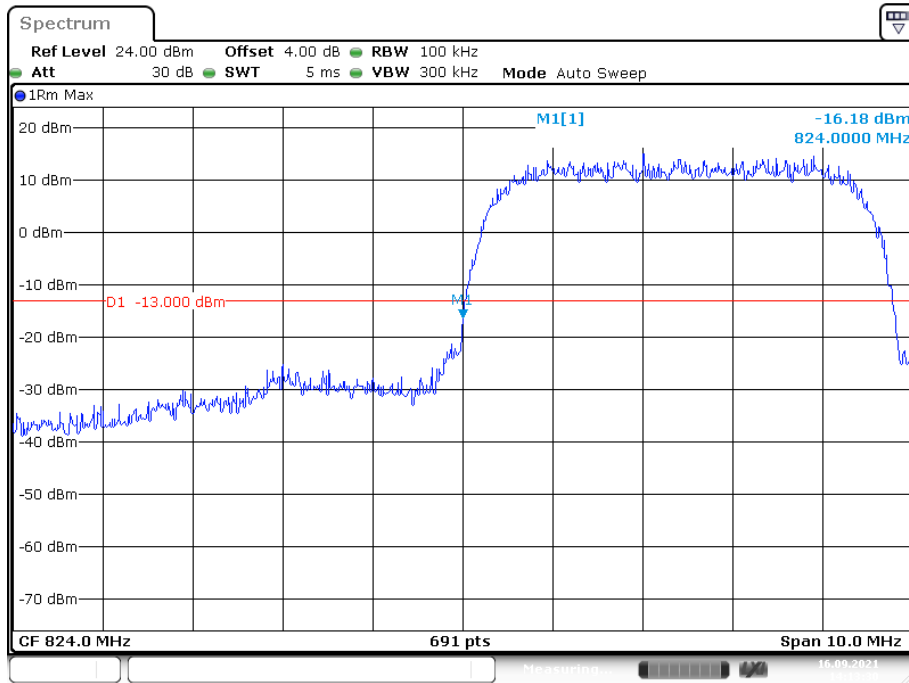
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### Cellular Band, Right Band Edge for GSM (GMSK) Mode



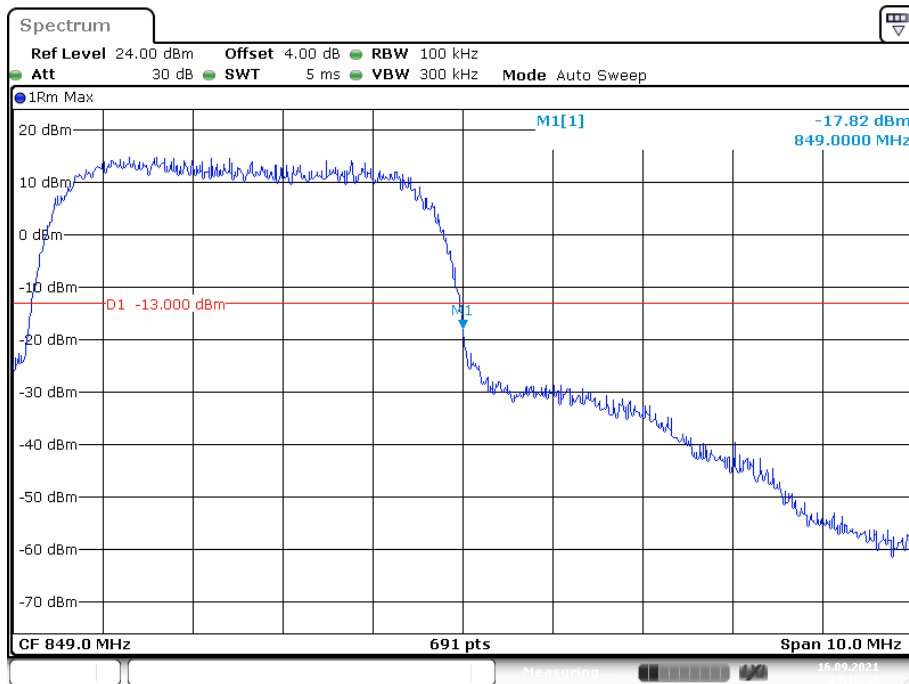
Date: 16.SEP.2021 16:47:52

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



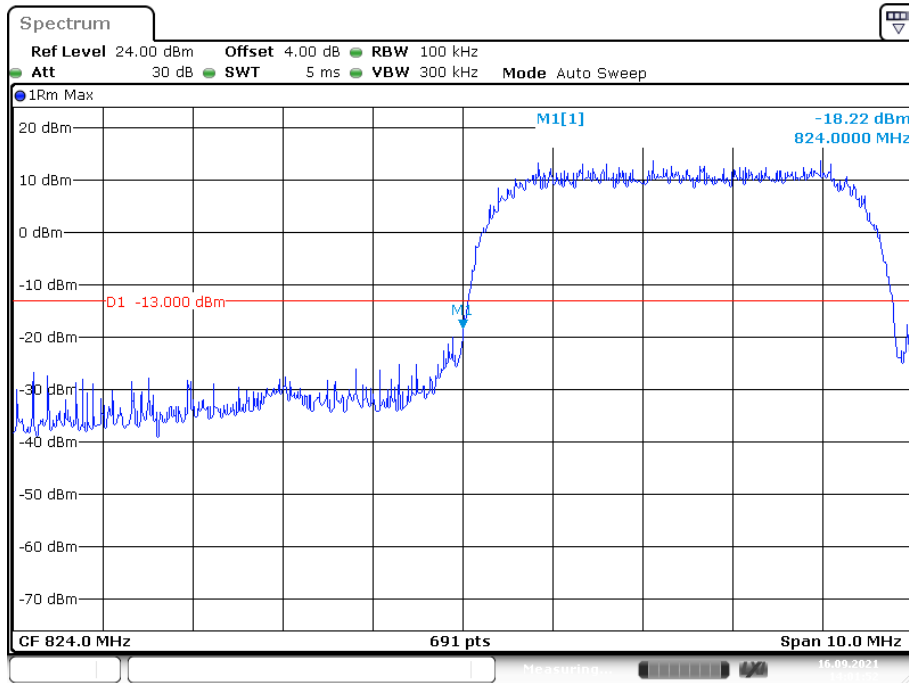
Date: 16.SEP.2021 14:13:30

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



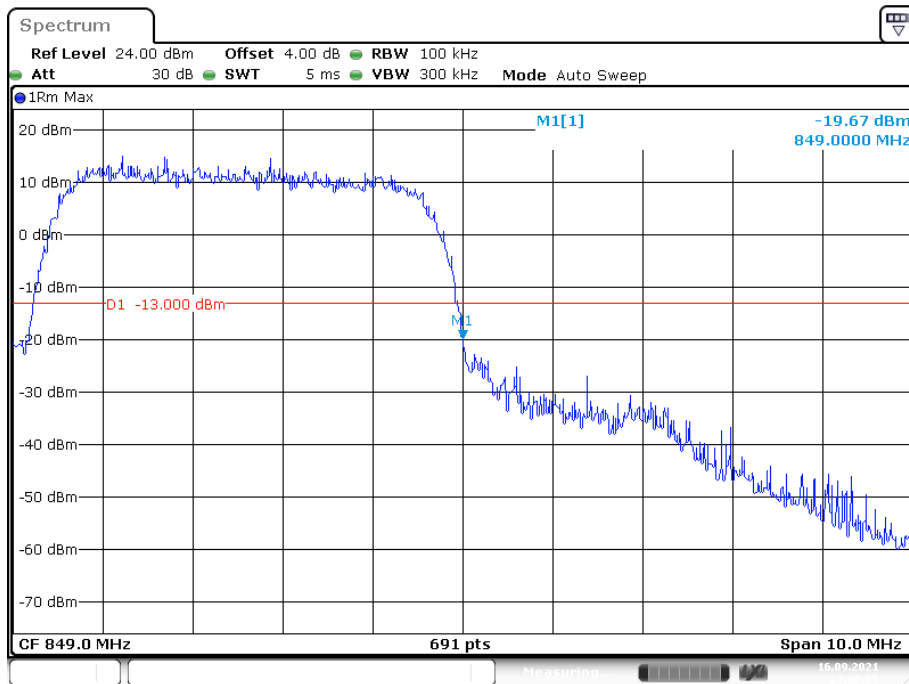
Date: 16.SEP.2021 14:12:38

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



Date: 16.SEP.2021 14:01:52

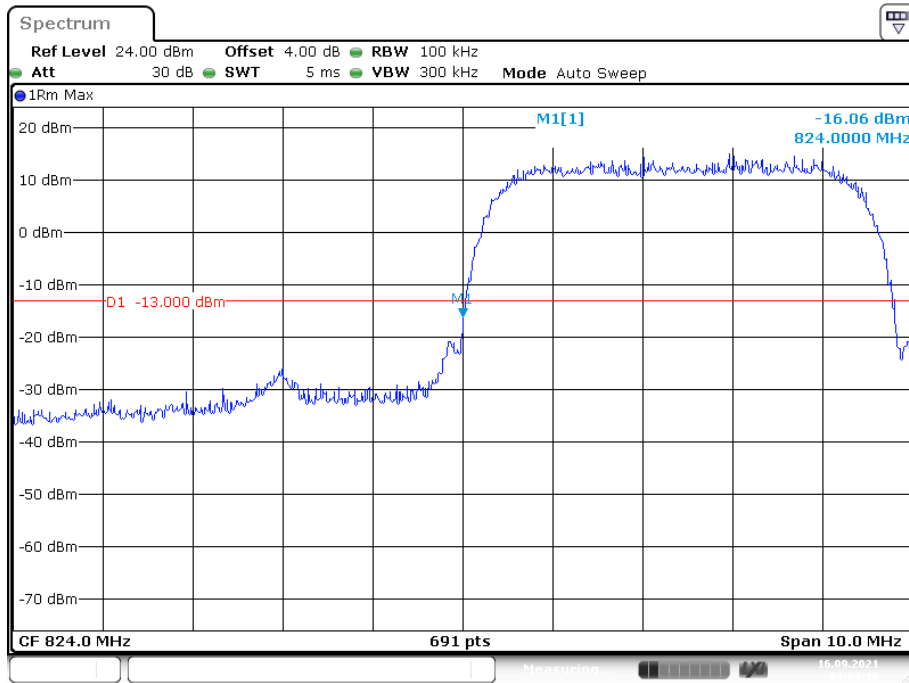
### Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



Date: 16.SEP.2021 14:00:55

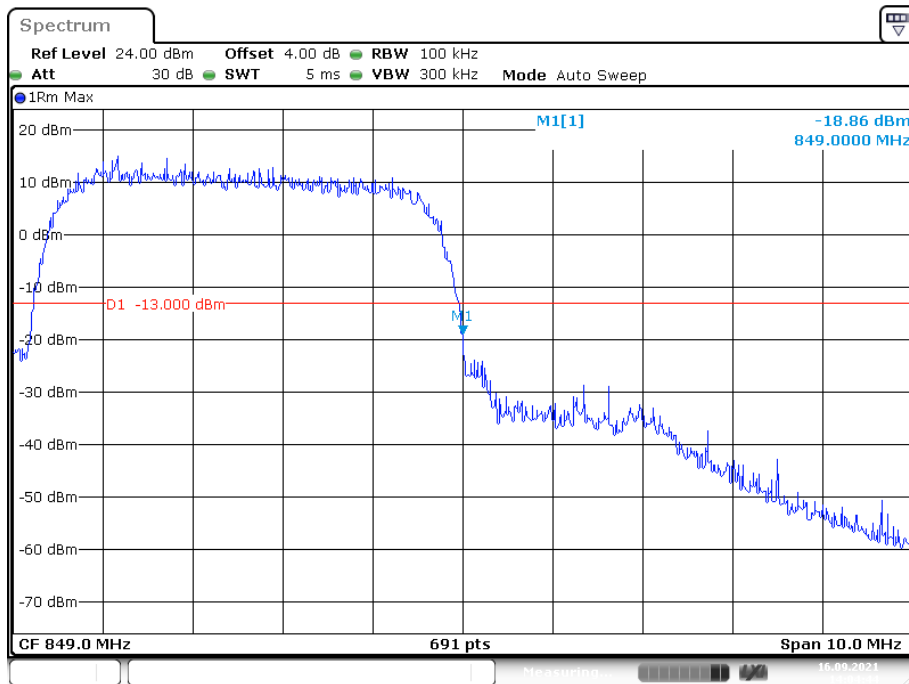


### Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



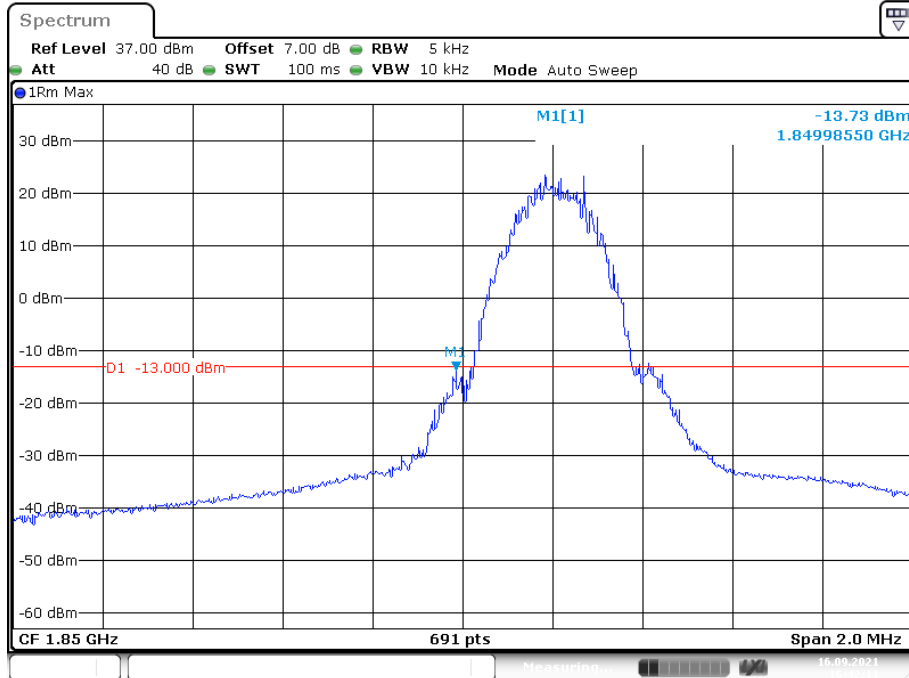
Date: 16.SEP.2021 14:03:16

### Cellular Band, Right Band Edge for HSUPA (BPSK) Mode

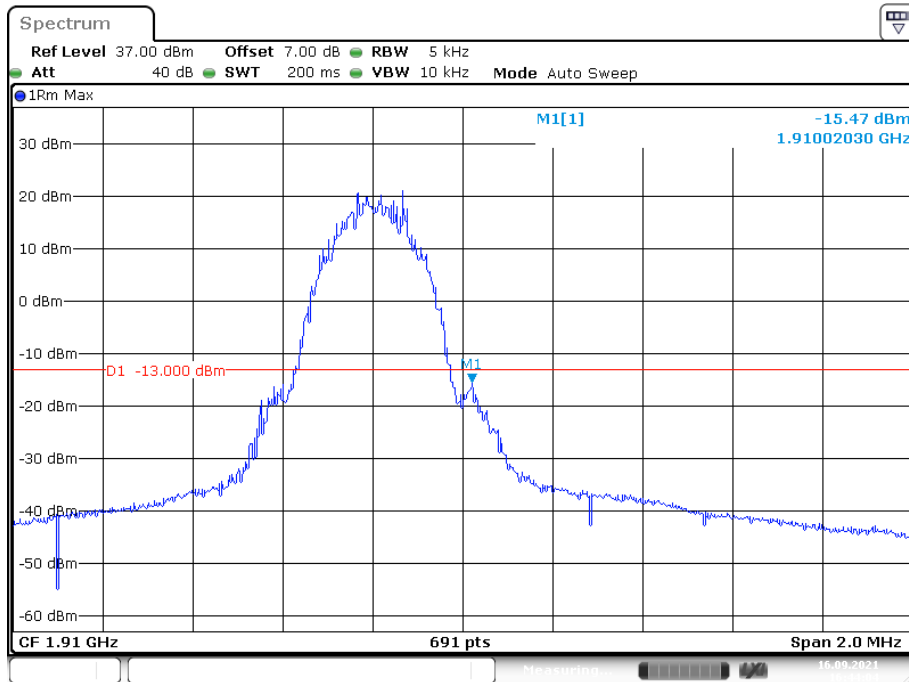


Date: 16.SEP.2021 14:04:44

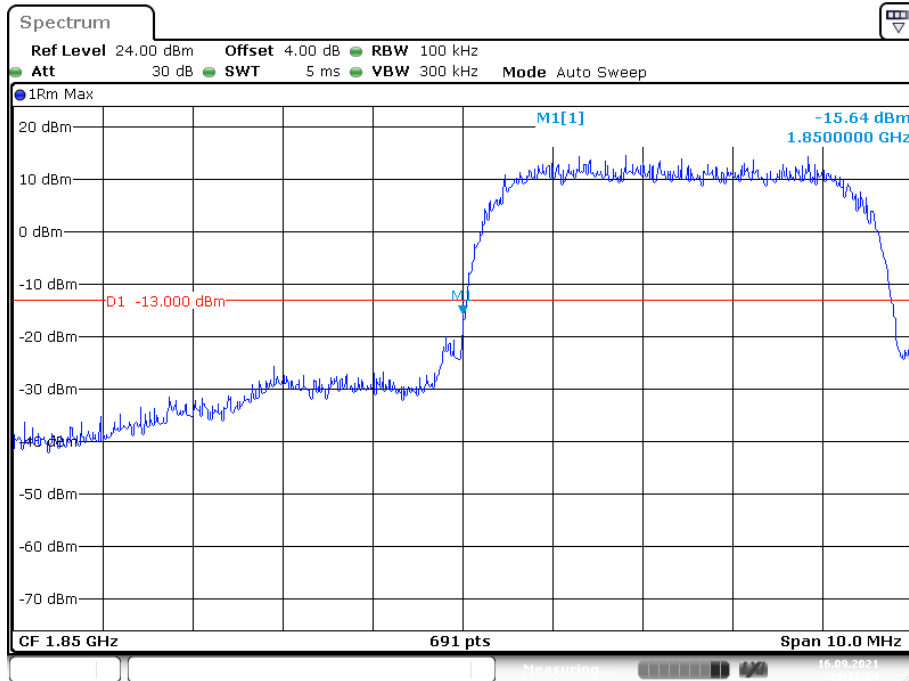
### PCS Band, Left Band Edge for GSM (GMSK) Mode



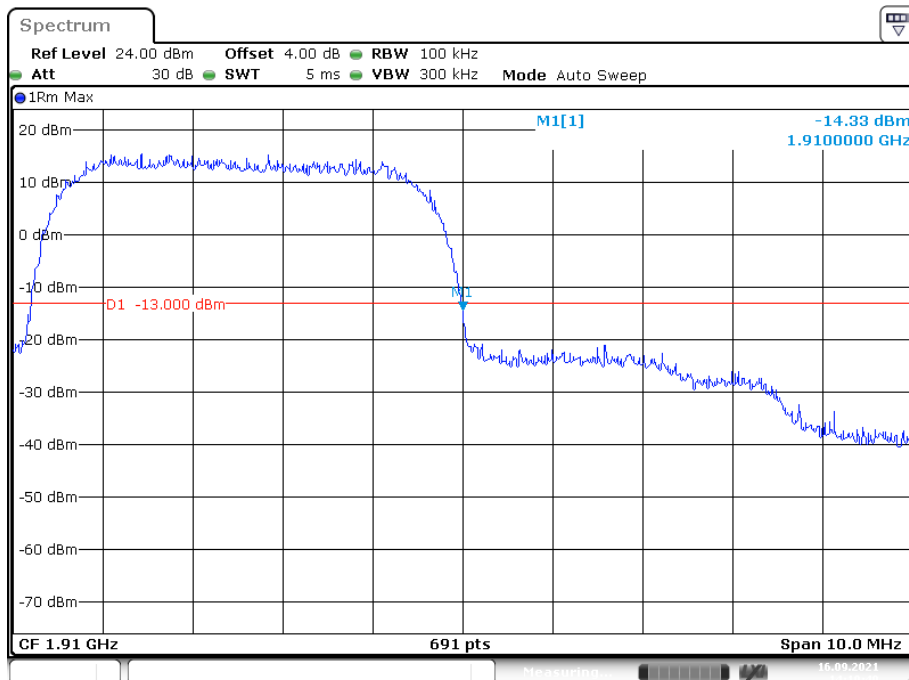
### PCS Band, Right Band Edge for GSM (GMSK) Mode



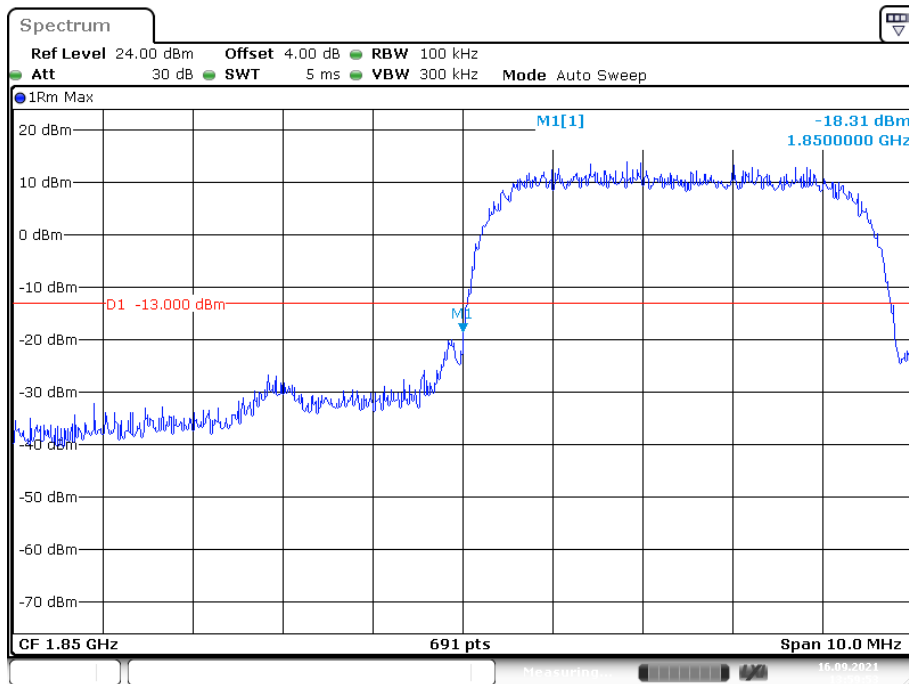
### PCS Band, Left Band Edge for RMC (BPSK) Mode



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

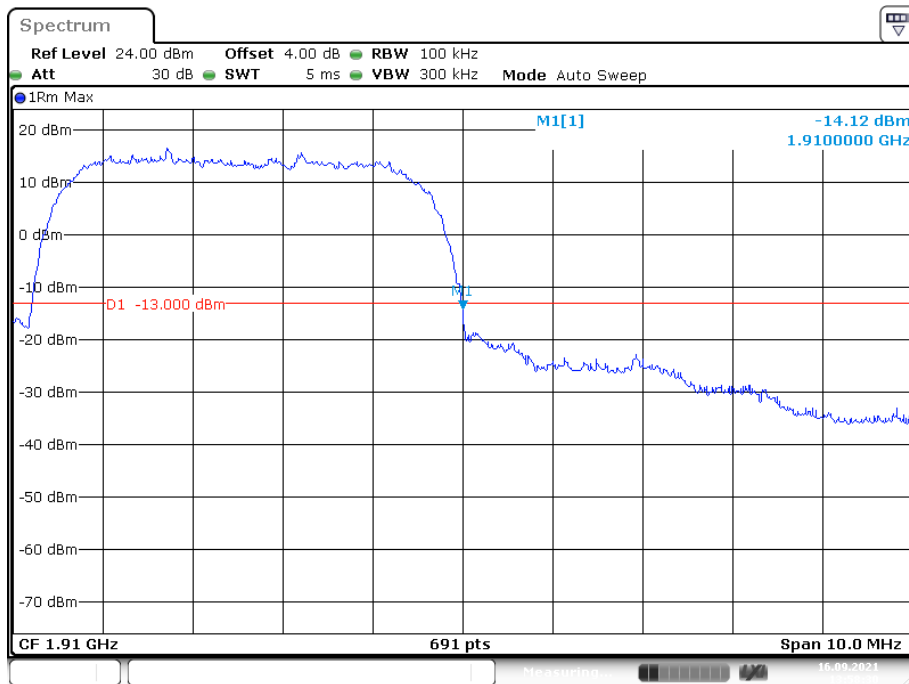


### PCS Band, Left Band Edge for HSDPA (16QAM) Mode



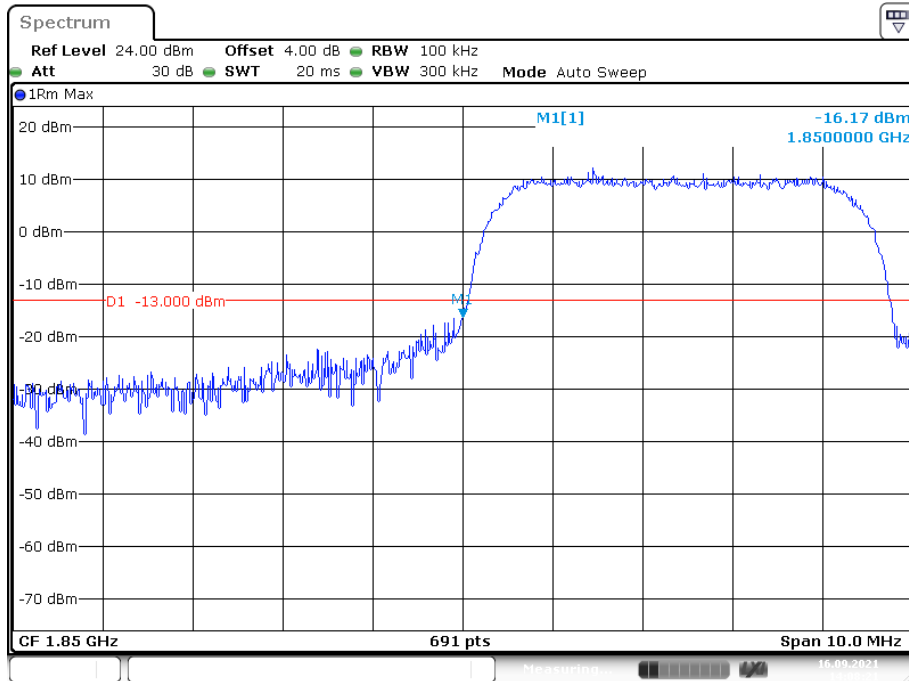
Date: 16.SEP.2021 13:59:53

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



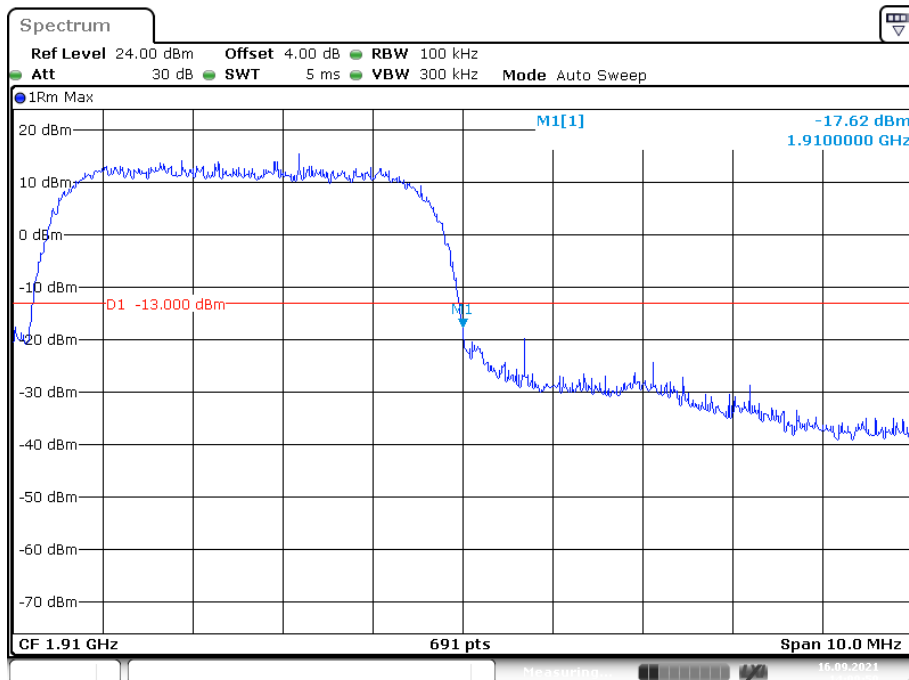
Date: 16.SEP.2021 13:58:30

### PCS Band, Left Band Edge for HSUPA (BPSK) Mode



Date: 16.SEP.2021 14:08:21

### PCS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 16.SEP.2021 14:09:50

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 and & §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

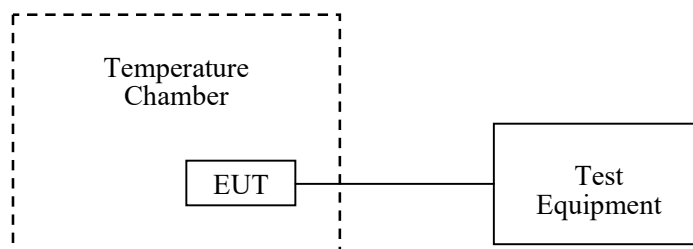
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### **Test Procedure**

**Frequency Stability vs. Temperature:** The equipment under test was connected to an external 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**

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Ting Lv from 2021-09-15 to 2021-10-18.

EUT operation mode: Transmitting

**Test Result: Pass**

Please refer to the following tables.

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

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-7	-0.0084	2.5
-20		-5	-0.0060	2.5
-10		-3	-0.0036	2.5
0		-8	-0.0096	2.5
10		-10	-0.0120	2.5
20		-7	-0.0084	2.5
30		-8	-0.0096	2.5
40		-5	-0.0060	2.5
50		-8	-0.0096	2.5
20		L.V.	-5	-0.0060
	H.V.	-3	-0.0036	2.5

**WCDMA Mode**

<b>Middle Channel, <math>f_0=836.6\text{MHz}</math></b>				
<b>Temperature (°C)</b>	<b>Voltage Supplied (<math>V_{DC}</math>)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>	<b>Limit (ppm)</b>
-30	N.V.	7	0.0084	2.5
-20		6	0.0072	2.5
-10		5	0.0060	2.5
0		7	0.0084	2.5
10		5	0.0060	2.5
20		4	0.0048	2.5
30		6	0.0072	2.5
40		6	0.0072	2.5
50		5	0.0060	2.5
20	L.V.	7	0.0084	2.5
	H.V.	7	0.0084	2.5

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

<b>Middle Channel, <math>f_0=1880.0\text{MHz}</math></b>				
<b>Temperature (°C)</b>	<b>Voltage Supplied (<math>V_{DC}</math>)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>	<b>Result</b>
-30	N.V.	25	0.0133	Pass
-20		29	0.0154	Pass
-10		25	0.0133	Pass
0		24	0.0128	Pass
10		26	0.0138	Pass
20		27	0.0144	Pass
30		24	0.0128	Pass
40		25	0.0133	Pass
50		24	0.0128	Pass
20	L.V.	29	0.0154	Pass
	H.V.	25	0.0133	Pass



**WCDMA Mode**

<b>Middle Channel, <math>f_0=1880.0</math> MHz</b>				
<b>Temperature (°C)</b>	<b>Voltage Supplied (V<sub>DC</sub>)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>	<b>Result</b>
-30	N.V.	-5	-0.0027	Pass
-20		-4	-0.0021	Pass
-10		-4	-0.0021	Pass
0		-5	-0.0027	Pass
10		5	0.0027	Pass
20		-3	-0.0016	Pass
30		-5	-0.0027	Pass
40		-4	-0.0021	Pass
50		-5	-0.0027	Pass
20		L.V.	-5	-0.0027
	H.V.	-4	-0.0021	Pass

**LTE:**  
**QPSK:**  
**Band 2:**

10.0 MHz Middle Channel, $f_0 = 1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	-7.00	-0.0037	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
	H.V.	-7.05	-0.0038	Pass

**Band 5:**

10.0 MHz Middle Channel, $f_0 = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-3.83	-0.0046	2.5
-20		9.11	0.0109	2.5
-10		8.51	0.0102	2.5
0		-7.15	-0.0085	2.5
10		-5.29	-0.0063	2.5
20		7.24	0.0087	2.5
30		-5.81	-0.0069	2.5
40		5.59	0.0067	2.5
50		6.87	0.0082	2.5
20		L.V.	9.94	0.0119
	H.V.	9.99	0.0119	2.5

**Band 7:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	F <sub>L</sub> Limit (MHz)	F <sub>H</sub> Limit (MHz)
-30	N.V.	2500.0232	2569.9602	2500	2570
-20		2500.0646	2569.9359	2500	2570
-10		2500.0547	2569.9299	2500	2570
0		2500.1264	2569.8832	2500	2570
10		2500.1201	2569.8938	2500	2570
20		2500.1731	2569.8509	2500	2570
30		2500.1641	2569.8465	2500	2570
40		2500.1989	2569.7959	2500	2570
50		2500.2177	2569.8221	2500	2570
20	L.V.	2500.2302	2569.7467	2500	2570
	H.V.	2500.0658	2569.9279	2500	2570

**Band 41:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	F <sub>L</sub> Limit (MHz)	F <sub>H</sub> Limit (MHz)
-30	N.V.	2535.0376	2654.9688	2535	2655
-20		2535.0235	2654.9253	2535	2655
-10		2535.1130	2654.8966	2535	2655
0		2535.0720	2654.9000	2535	2655
10		2535.1914	2654.8385	2535	2655
20		2535.1494	2654.8603	2535	2655
30		2535.2238	2654.7920	2535	2655
40		2535.2207	2654.8161	2535	2655
50		2535.2710	2654.7373	2535	2655
20		L.V.	2535.2493	2654.7721	2535
	H.V.	2535.0549	2654.9780	2535	2655

Note: the frequency range 2535-2655MHz was declared by applicant.

**16QAM:****Band 2:**

10.0 MHz Middle Channel, $f_0 = 1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	-5.01	-0.0027	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
	H.V.	7.52	0.004	Pass

**Band 5:**

10.0 MHz Middle Channel, $f_0 = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-3.83	-0.0046	2.5
-20		6.80	0.0081	2.5
-10		-9.52	-0.0114	2.5
0		-8.15	-0.0097	2.5
10		-8.88	-0.0106	2.5
20		-9.82	-0.0117	2.5
30		8.38	0.01	2.5
40		6.75	0.0081	2.5
50		-5.89	-0.007	2.5
20		L.V.	8.98	0.0107
	H.V.	-7.83	-0.0094	2.5

**Band 7:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	F <sub>L</sub> Limit (MHz)	F <sub>H</sub> Limit (MHz)
-30	N.V.	2500.0301	2569.9237	2500	2570
-20		2500.0367	2569.9254	2500	2570
-10		2500.0807	2569.8626	2500	2570
0		2500.0689	2569.8454	2500	2570
10		2500.1113	2569.8145	2500	2570
20		2500.1429	2569.7883	2500	2570
30		2500.1633	2569.7454	2500	2570
40		2500.1956	2569.7223	2500	2570
50		2500.2292	2569.6684	2500	2570
20	L.V.	2500.2166	2569.6494	2500	2570
	H.V.	2500.0216	2569.9756	2500	2570

**Band 41:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	F <sub>L</sub> Limit (MHz)	F <sub>H</sub> Limit (MHz)
-30	N.V.	2535.0339	2654.9488	2535	2655
-20		2535.0686	2654.9201	2535	2655
-10		2535.0738	2654.9189	2535	2655
0		2535.0943	2654.8791	2535	2655
10		2535.1259	2654.8903	2535	2655
20		2535.1237	2654.8081	2535	2655
30		2535.1936	2654.8673	2535	2655
40		2535.1642	2654.7294	2535	2655
50		2535.2680	2654.8072	2535	2655
20		L.V.	2535.2101	2654.6649	2535
	H.V.	2535.0741	2654.9284	2535	2655

Note: the frequency range 2535-2655MHz was declared by applicant.

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