FCC RADIO TEST REPORT

FCC ID	:	**PKRISGFW2010**
Equipment	:	**5G High Performance Sub6 & mmWave Outdoor CPE**
Brand Name	:	**Inseego**
Model Name	:	**FW2010-1, FW2010e-1**
Marketing Name	:	**FW2010**
Applicant	:	**Inseego Corp.** **9710 Scranton Road Suite 200, San Diego, CA 92121**
Manufacturer	:	**MeiG Smart Technology Co., Ltd** **Floor 2, Office Building No. 5, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen**
Standard	:	**FCC 47 CFR Part 2, and 30**

The product was received on Mar. 08, 2021 and testing was started from Mar. 30, 2021 and completed on Apr. 27, 2021. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures ANSI C63.26-2015 and has been in compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FG130414-01	01	Initial issue of report	Apr. 30, 2021
FG130414-01	02	Added note in appendix B	May 10, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Limit	Result (PASS/FAIL)	Remark
3.4	§2.1046 §30.202	EIRP Measurement	+55dBm	Pass	-
3.5	§2.1049	Occupied Bandwidth	Not Applicable	Reporting only	-
3.6	§2.1053 §30.203	Radiated Spurious Emission	-5dBm/MHz -13dBm/MHz	Pass	-
3.7	§2.1055	Frequency Stability for Temperature & Voltage	Within the band	Pass	-
Remark: This is a variant report by adding 2CC bandwidths via software enabled. All 1CC test cases were performed on original report which can be referred to Sporton Report Number FG130414B under same FCC ID, PKRISGFW2010.					

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Dara Chiu

1 General Description

1.1 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	5G High Performance Sub6 & mmWave Outdoor CPE
Brand Name	Inseego
Model Name	FW2010-1, FW2010e-1
Model Name	FW2010
FCC ID	PKRISGFW2010
EUT supports Radios application	LTE/5G NR/GNSS Bluetooth LE

Remark: The purpose of different model name (FW2010-1 and FW2010e-1) is for marketing segmentation, and all the tests were performed with FW2010-1.

EUT Information List	
S/N	Performed Test Item
#03	All test items

Remark: Sample S/N number is under internal control.

1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Device Category in Part 30	Transportable station
Tx Frequency	NR band n260: 37GHz ~ 40GHz NR band n261: 27.5GHz ~ 28.35GHz
Rx Frequency	NR band n260: 37GHz ~ 40GHz NR band n261: 27.5GHz ~ 28.35GHz
Support Bandwidth	NR band n260: 50 MHz and 100 MHz NR band n261: 50 MHz and 100 MHz
Maximum Number of contiguous CC	2
Maximum Aggregated Bandwidth	200MHz
Maximum Output Power (EIRP)	NR band n260: 45.15 dBm NR band n261: 42.06 dBm
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM

Note: Highest EIRP was measured on dual beam case for n260 and n261 band.

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory			
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978			
Test Site Information	Site No.	Engineer	Temperature	Humidity
	03CH10-HY	Yu Wang	23.2 ~ 24.1 °C	59.4 ~ 60.8 %
	03CH18-HY	Yu Wang	21.0 ~ 25.7 °C	60.1 ~ 63.9 %

FCC Designation No. TW3786

Note: The highest accredited frequency is 280GHz and the ISO 17025 accreditation letter can be found on TAF (Taiwan Accreditation Foundation) Website (Website link).

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR Part 2, 30
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 842590 D01 Upper Microwave Flexible Use Service v01r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

The EUT was set to 2CC (Component Carriers) operation mode. Each CC supports 50 and 100 MHz bandwidths, and a maximum of 200 MHz bandwidth can be achieved with 2CC configuration.

The EUT supports single beam operation (SISO) and dual beams transmitted simultaneously (MIMO) and the detail of product operation is in the operation description document as submitted in separate document. Preliminary EIRP test was performed for all beam configurations in the anechoic chamber at the manufacturer's facility so the EIRP worst case beam-pair were identified. EIRP was investigated that the dual beams' rated maximum EIRP is higher than single beam's one. The NR radio operation is controlled via software tool QRCT FTM mode (Factory mode).

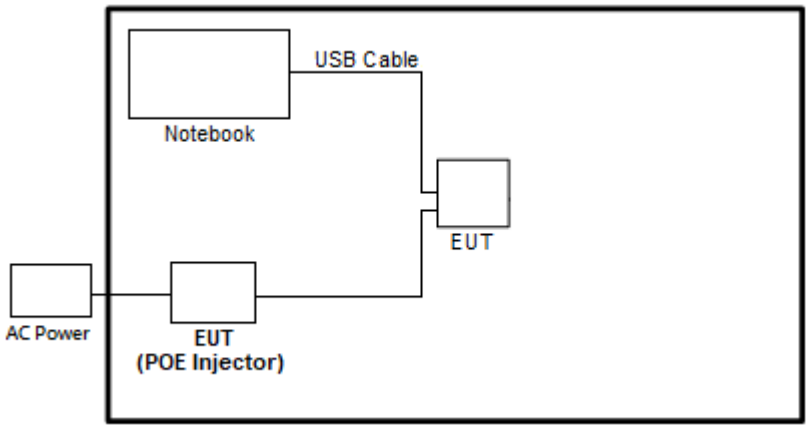
The EUT is forced to operate continuously (100% duty cycle) with maximum output power during the test.

2.1 Test Mode

For radiated measurement, the pre-scan is performed to find the worst cases EUT position.

Test Items	Band	2CC Bandwidth (MHz)		Modulation				RB #			Test Channel		
		100	200	PI/2 BPSK	QPSK	16QAM	64QAM	8	-	Full	L	M	H
EIRP	n260 n261	v	v	v	v	v	v	v		v	v	v	v
99% Occupied Bandwidth	n260 n261	v	v	v	v	v	v			v	v	v	v
Out of Band Emission	n260 n261	v	v	v	v	v	v	v		v	v		v
Spurious Emission	n260 n261	v	v		v					v	v	v	v
Frequency Stability	n260 n261	CW tone										v	
Remark	1. The mark "v " means that this configuration is chosen for testing. 2. Due to MPR implemented as defined by 3GPP specification (when the bandwidth of the RB allocation size is less than 10.8MHz, there is a MPR of 10 dB), the 8RB is used as lowest RB configuration. As the worst case, the EIRP of Outer Full RBs is greater than Inner RBs configuration. 3. For the EIRP of fundamental signal, different RB settings with QPSK are evaluated as preliminary test. The worst conditions are reported with different modulations and are reported accordingly. Furthermore, the worst condition of the EIRP of fundamental signal is chosen for radiated spurious emission from 30MHz to 200GHz for supporting bands, respectively. 4. For Out of band emissions, emissions are evaluated with different RB configurations, Outer RBs and Inner Full RB and the worst cases are reported accordingly. 5. For simultaneous transmission (FR2 and LTE), the 1CC configuration operating the highest output power as worst case (in Sporton Report Number: FG130414B) was verified and no obvious new emissions found. 6. Spurious emissions are initially measured by using radiated EIRP method. If EIRP measurement results exceed the emission limit, then TRP measurement will be used for official test report. Test results of TRP measurement are marked as "TRP Measurement". 7. Both modulation type DFT-s OFDM and CP-OFDM are evaluated.												

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Notebook	Acer	N16P7	N/A	N/A	AC I/P: Unshielded, 1.2m DC O/P: Shielded, 1.8m

Remark: Applicant has ensured support unit would not be attached with the product on the market, support unit is provided by lab for testing.

2.4 Measurement Results Explanation Example

According to ANSI C63.26-2015 Section 5.2.7

EIRP (dBm) = E(dBuV/m) + 20log (D) -104.8.

where D is the measurement distance (in the far field region) in m.

E (dBuV/m) = Spectrum Reading Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107

Hence, the spectrum analyzer *Offset* is derived including RF cable loss and antenna factor.

Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

The conversion loss of RF mixer is also included by the mixer table of spectrum analyzer when measurement frequency is above 40GHz.

Example :

Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 42.3 + 3.0 + 107 + 20log(1) – 104.8

= 47.5 (dB)

2.5 Far Field Condition for Frequency above 18GHz

Horn Antenna	Frequency (GHz)	Antenna Dimension A (mm)	Wavelength (λ) (m)	Far field R (m) >= $2A^2/\lambda$	Measurement Distance (D) (m)	Distance Factor 20log(D) (dB)
BBHA 9170	18	60	0.0167	0.43	1.2	1.58
	40	60	0.0075	0.96		
QWH-UPRR00	40	48	0.0075	0.61	1.2	1.58
	60	48	0.0050	0.92		
QWH-EPRR00	60	31	0.0050	0.38	1.2	1.58
	90	31	0.0033	0.58		
QWH-FPRR00	90	21	0.0033	0.26	1.2	1.58
	140	21	0.0021	0.41		
QWH-GPRR00	140	15	0.0021	0.21	1.2	1.58
	220	15	0.0014	0.33		

2.6 Frequency List of Low/Middle/High Channels

NR Band n260 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100 (2CC: 50+50)	Frequency 1	37025.04	38475.00	39925.08
	Frequency 2	37074.96	38524.92	39975.00
200 (2CC: 100+100)	Frequency 1	37050.00	38450.04	39849.96
	Frequency 2	37149.96	38550.00	39949.92

NR Band n261 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100 (2CC: 50+50)	Frequency 1	27525.00	27900.00	28275.00
	Frequency 2	27574.92	27949.92	28324.92
200 (2CC: 100+100)	Frequency 1	27550.08	27875.04	28200.00
	Frequency 2	27650.04	27975.00	28299.96

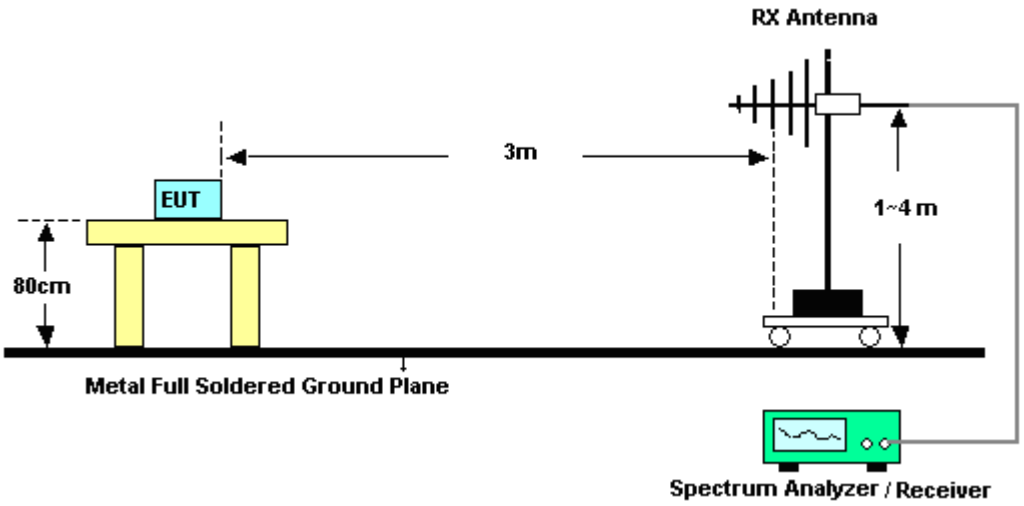
3 Radiated Test Items

3.1 Measuring Instruments

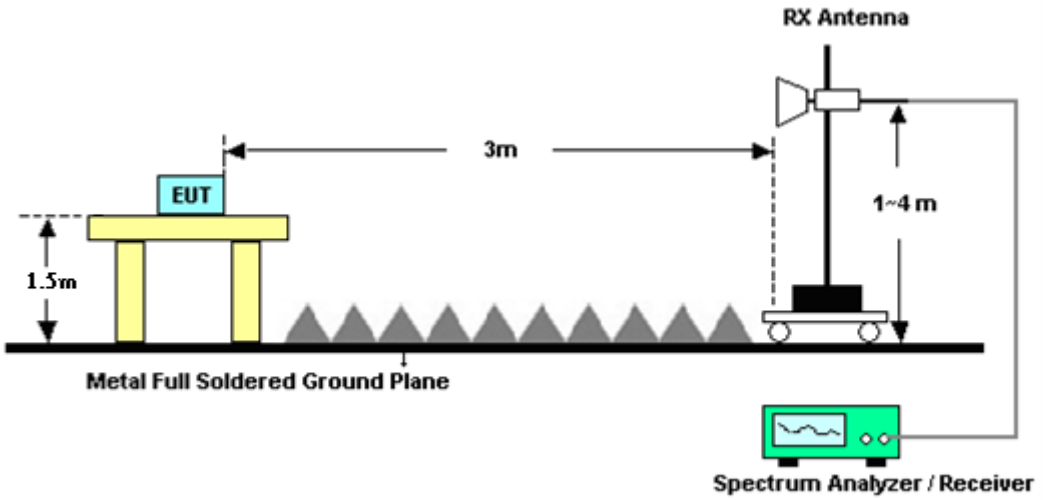
See list of measuring instruments of this test report.

3.2 Test Setup

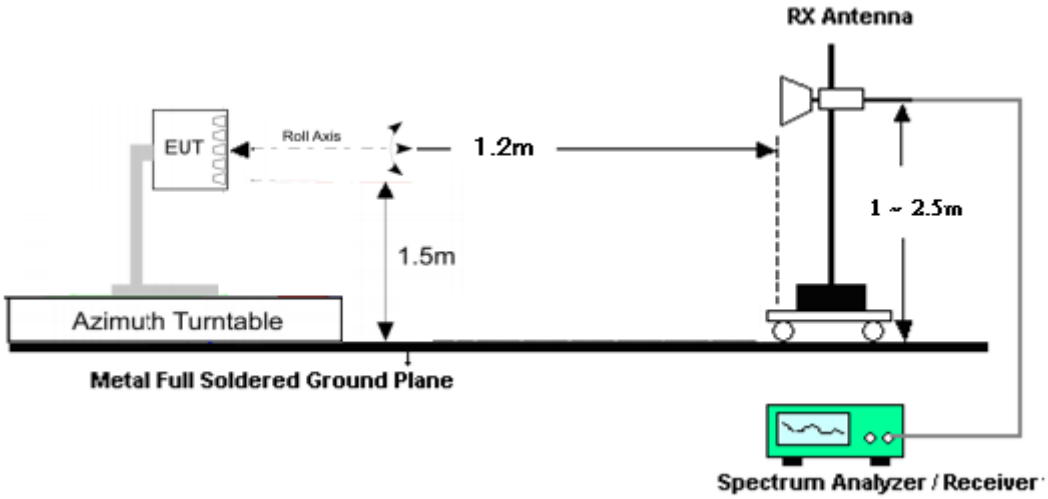
For radiated emissions from 30MHz to 1GHz



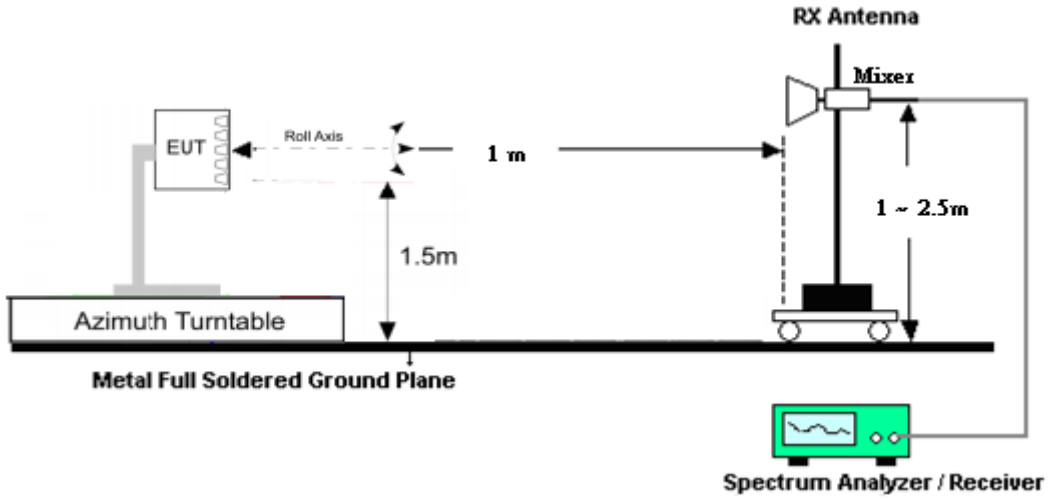
For radiated emissions 1GHz to 18GHz



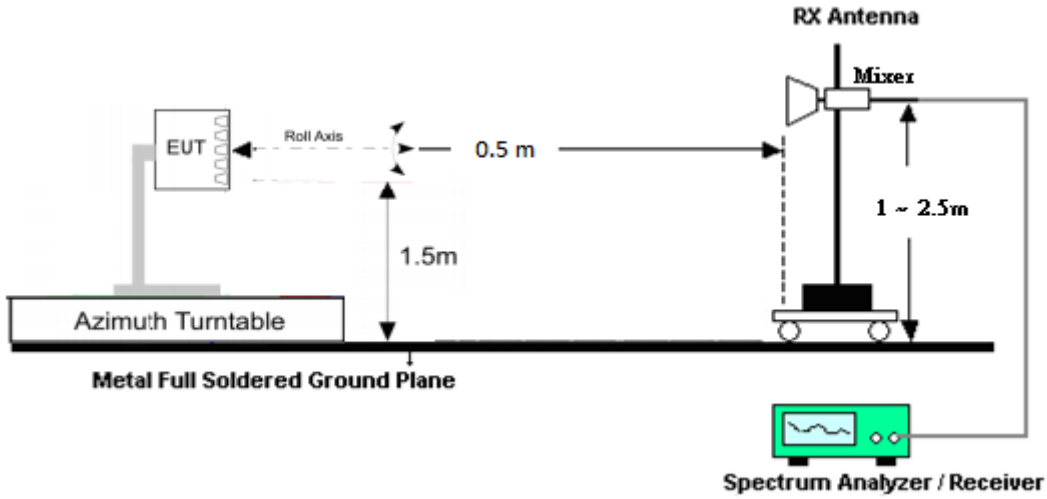
For radiated emissions above 18GHz up to 40GHz



For radiated emissions above 40GHz up to 140GHz



For radiated emissions above 140GHz up to 200GHz



3.3 Test Result of Radiated Test

Please refer to Appendix A and B.

3.4 EIRP Measurement

3.4.1 Description of EIRP Measurement

For transportable stations, the average power of the sum of all antenna elements is limited to a maximum EIRP of +55 dBm.

3.4.2 Test Procedures

1. Set EUT at maximum output power.
2. Select lowest, middle, and highest channels for each band and different modulation.
3. Enable channel power function of spectrum analyzer
4. Set frequency would like to be investigated.
5. Set Detector = RMS
6. Set Trace mode = trace average
7. Set Sweep time = auto couple
8. Set sweep points ≥ 2 x Span/RBW
9. Set sweep count 100 and wait until the trace to be stabilized
10. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
11. Measure and record the power level from the spectrum analyzer.
12. The test result is calculated according to

    ANSI C63.26-2015 Section 5.2.7

    EIRP (dBm) = E(dBuV/m) + 20log (D) -104.8.

    where D is the measurement distance (in the far field region) in m.

    E (dBuV/m) = Spectrum Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107

    That is, set the spectrum offset including sum of

    Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

3.5 Occupied Bandwidth

3.5.1 Description of Occupied Bandwidth Measurement

This is for reporting only.

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

3.5.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.4

1. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be at least 1.5 times the anticipated OBW.
2. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
3. Set the detection mode to peak, and the trace mode to max hold.
4. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.6 Radiated Spurious Emission Measurement

3.6.1 Description of Radiated Spurious Emission Measurement

The spectrum is scanned from 30 MHz up to 200GHz.

The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be −13 dBm/MHz or lower. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm/MHz or lower.

3.6.2 Test Procedures

1. Set EUT at maximum output power.
2. Select lowest, middle, and highest channels for each band and different modulation.
3. Measure and record the power level from the spectrum analyzer.
4. Set frequency would like to be investigated.
5. Set Detector = RMS, Trace mode = trace average, sweep time = auto couple
6. Set sweep points ≥ 2 x Span/RBW, sweep count 100 and wait until the trace to be stabilized.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. For measurement frequency from 30MHz to 18GHz:

   An antenna was substituted in place of the EUT and was driven by a signal generator.
   Tune the output power of signal generator to the same emission level with EUT maximum spurious emission. Take record of output power and repeat for another polarization.
9. For measurement frequency above 18GHz:

   The test result is calculated according to ANSI C63.26-2015 Section 5.2.7 and 5.7.3 and 5.7.4

   EIRP (dBm) = E(dBuV/m) + 20log (D) -104.8.

   where D is the measurement distance (in the far field region) in m.

   E (dBuV/m) = Spectrum Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107

   That is, set the spectrum offset including sum of

   Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

   If EIRP measurement results exceed the emission limit, then TRP measurement will be used as an alternative method. Test results of TRP measurement are marked as “TRP Measurement”.
10. The conversion loss of RF mixer is also included in conversion loss table of the spectrum analyzer when measurement frequency is above 40GHz.

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.

1. The EUT was set up in the thermal chamber.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.

1. The EUT was placed in a temperature chamber at 20° C.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz~40GHz	Dec. 11, 2020	Mar. 30, 2021 ~ Apr.27, 2021	Dec. 10, 2021	Radiation (03CH18-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3044	101010	10Hz~44GHz	Nov. 25, 2020	Mar. 30, 2021 ~ Apr.27, 2021	Nov. 24, 2021	Radiation (03CH18-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801607/2	9kHz~40GHz	Dec. 22, 2020	Mar. 30, 2021 ~ Apr.27, 2021	Dec. 21, 2021	Radiation (03CH18-HY)
Turn Table	EMEC	N/A	N/A	Phi/Theta 0~360 Degree	N/A	Mar. 30, 2021 ~ Apr.27, 2021	N/A	Radiation (03CH18-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table	N/A	Mar. 30, 2021 ~ Apr.27, 2021	N/A	Radiation (03CH18-HY)
Temperature & Humidity Cabinet Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Nov. 10, 2020	Apr. 27 , 2021	Nov. 09, 2021	Radiation (03CH18-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	103738	9kHz to 30GHz	May 14, 2020	Apr. 24, 2021	May 13, 2021	Radiation (03CH18-HY)
Harmonic Mixer (*)	Rohde & Schwarz	RPG FS-Z60	101033	40GHz to 60GHz	Mar. 17, 2020	Apr. 24, 2021	Mar. 16, 2023	Radiation (03CH18-HY)
Harmonic Mixer (*)	Rohde & Schwarz	FSZ-90	101811	60GHz to 90GHz	Jul. 16, 2018	Apr. 24, 2021	Jul. 15, 2021	Radiation (03CH18-HY)
Harmonic Mixer (*)	Rohde & Schwarz	RPG FS-Z140	101128	90GHz to 140GHz	Oct. 26, 2020	Apr. 24, 2021	Oct. 25, 2023	Radiation (03CH18-HY)
Harmonic Mixer (*)	Rohde & Schwarz	RPG FS-Z220	101014	140GHz to 220GHz	Aug. 27, 2018	Apr. 24, 2021	Aug. 26, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-UPRR00	923600007	40-60 GHz	Aug. 17, 2018	Apr. 24, 2021	Aug. 16, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-EPRR00	784600034	60-90 GHz	Aug. 17, 2018	Apr. 24, 2021	Aug. 16, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-FPRR00	923800008	90-140 GHz	Aug. 17, 2018	Apr. 24, 2021	Aug. 16, 2021	Radiation (03CH18-HY)
Antenna	Quinstar	QWH-GPRR00	923900001	140-220 GHz	Aug. 17, 2018	Apr. 24, 2021	Aug. 16, 2021	Radiation (03CH18-HY)

Note 1: (*) Equipment manufacturer's Calibration Certificate.

Note 2: The Standard Gain Horn Antennas are calibrated by the ISO 17025 accredited test lab MWM Lab (http://en.mwmlab.com/about), a sub unit of Belarussian State University of Informatics and Radio electronics which is accredited by the Belarusian State Centre for Accreditation (BSCA). BSCA is the National accreditation body of the Republic of Belarus and an associated member of the International Laboratory Accreditation Cooperation (ILAC).

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 21, 2020	Apr. 25, 2021	Oct. 20, 2021	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	35413 & 02	30MHz~1GHz	Feb. 10, 2021	Apr. 25, 2021	Feb. 09, 2022	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1GHz~18GHz	Aug. 04, 2020	Apr. 25, 2021	Aug. 03, 2021	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800-30-10P	160118550004	1GHz~18GHz	Mar. 01, 2021	Apr. 25, 2021	Feb. 28, 2022	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY53470118	10Hz~44GHz	Jan. 15, 2021	Apr. 25, 2021	Jan. 14, 2022	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Apr. 25, 2021	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Apr. 25, 2021	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Apr. 25, 2021	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Apr. 25, 2021	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY55420170	20MHz~8.4GHz	May 21, 2020	Apr. 25, 2021	May 20, 2021	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/4PE,MY11693/4PE,MY2855/2	30MHz~1GHz	Nov. 06, 2020	Apr. 25, 2021	Nov. 05, 2021	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/4PE,MY11693/4PE,MY2855/2	1GHz~18GHz	Nov. 06, 2020	Apr. 25, 2021	Nov. 05, 2021	Radiation (03CH10-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.02**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.26**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.62**

Uncertainty of Radiated Emission Measurement (40 GHz ~ 140 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.92**

Uncertainty of Radiated Emission Measurement (140 GHz ~ 200 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.78**

Appendix A.1 Test Results of EIRP: NR Band n260

EIRP Power(Average power)

NR Band n260 (Beam ID: 63+319) Maximum Average EIRP [dBm]					
Channel	**BW [MHz]**	**Waveform**	**Modulation**	**Outer Full**	**Inner Full**
Lowest	100	DFT-S	QPSK	41.82	-
	100	CP	QPSK	41.93	-
	100	DFT-S	BPSK	42.72	37.83
	100	DFT-S	16QAM	41.68	-
	100	DFT-S	64QAM	39.36	-
	200	DFT-S	QPSK	44.10	-
	200	CP	QPSK	42.07	-
	200	DFT-S	BPSK	45.15	39.43
	200	DFT-S	16QAM	44.09	-
	200	DFT-S	64QAM	41.85	-
Middle	100	DFT-S	QPSK	40.61	-
	200	DFT-S	QPSK	42.35	-
Highest	100	DFT-S	QPSK	40.24	-
	200	DFT-S	QPSK	40.77	-

Note: Due to MPR implemented as defined by 3GPP specification, the EIRP of Outer Full RBs is greater than Inner RBs configuration and is mainly tested as the worst case.

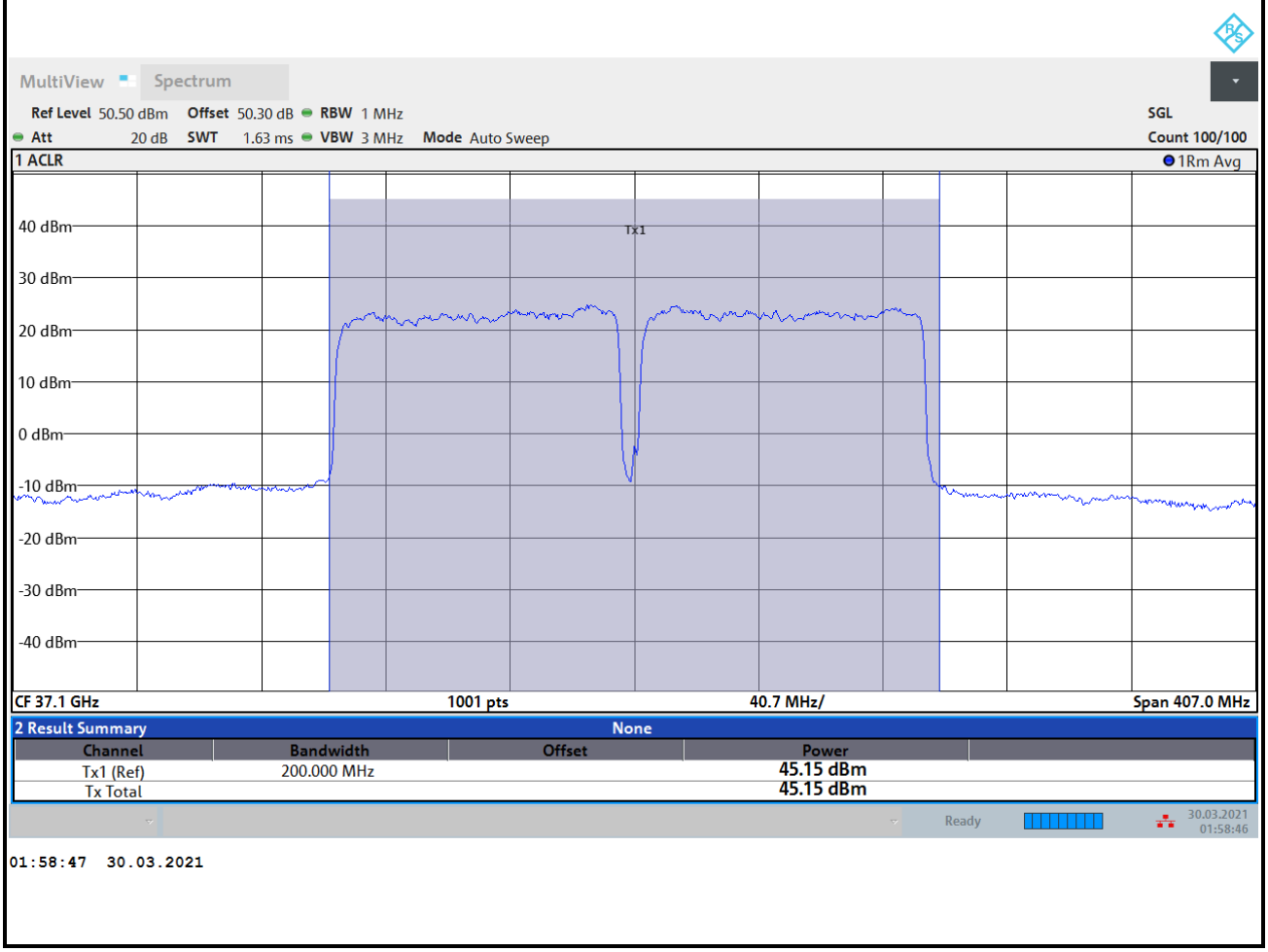
NR Band n260 (Beam ID: 63) Maximum Average EIRP [dBm]				
Channel	**BW [MHz]**	**Waveform**	**Modulation**	**Outer Full**
Lowest	100	DFT-S	QPSK	39.07
	100	CP	QPSK	39.34
	100	DFT-S	BPSK	40.14
	100	DFT-S	16QAM	39.05
	100	DFT-S	64QAM	36.73
	200	DFT-S	QPSK	39.24
	200	CP	QPSK	39.31
	200	DFT-S	BPSK	40.23
	200	DFT-S	16QAM	39.29
	200	DFT-S	64QAM	36.87

NR Band n260 (Beam ID: 319) Maximum Average EIRP [dBm]				
Channel	**BW [MHz]**	**Waveform**	**Modulation**	**Outer Full**
Lowest	100	DFT-S	QPSK	38.47
	100	CP	QPSK	38.49
	100	DFT-S	BPSK	39.38
	100	DFT-S	16QAM	38.37
	100	DFT-S	64QAM	35.98
	200	DFT-S	QPSK	38.18
	200	CP	QPSK	38.04
	200	DFT-S	BPSK	39.11
	200	DFT-S	16QAM	38.1
	200	DFT-S	64QAM	35.63

NR Band n260

EIRP Worst Case Plot

Lowest Channel / 200MHz / BPSK / 64RB0 (Beam ID: 63+319)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 43.8 + 2.72 + 107 + 20log(1.2) – 104.8 = 50.30 (dB)

Appendix A.2 Test Results of EIRP: n261

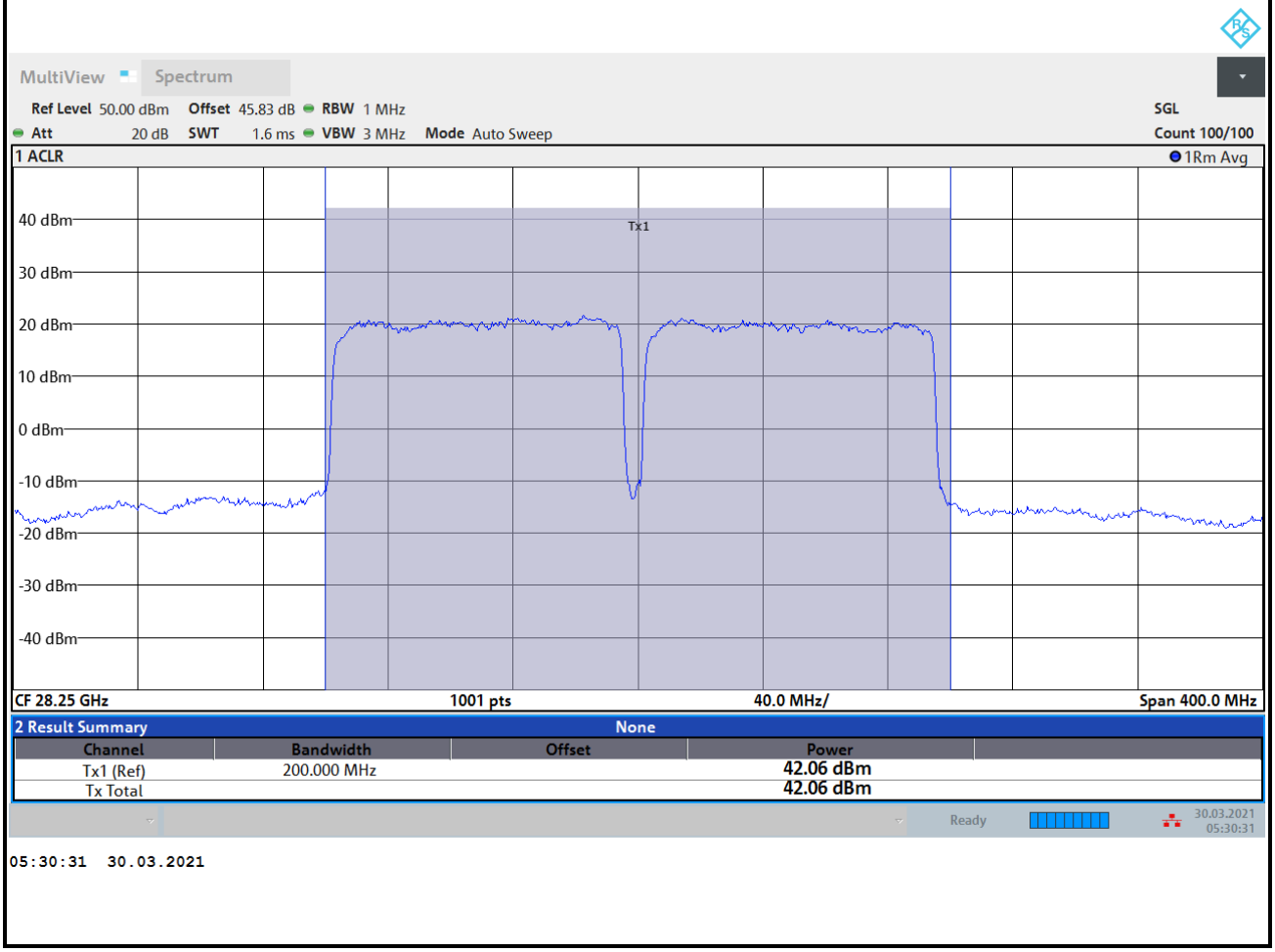
EIRP Power(Average power)

NR Band n261 (Beam ID: 63+319) Maximum Average EIRP [dBm]					
Channel	BW [MHz]	Waveform	Modulation	Outer Full	Inner Full
Lowest	100	DFT-S	QPSK	37.01	-
	200	DFT-S	QPSK	40.22	-
Middle	100	DFT-S	QPSK	39.79	-
	100	CP	QPSK	37.49	-
	100	DFT-S	BPSK	40.17	33.19
	100	DFT-S	16QAM	39.78	-
	100	DFT-S	64QAM	36.73	-
	200	DFT-S	QPSK	40.48	-
Highest	100	DFT-S	QPSK	37.37	-
	200	DFT-S	QPSK	41.13	-
	200	CP	QPSK	38.38	-
	200	DFT-S	BPSK	42.06	35.60
	200	DFT-S	16QAM	41.17	-
	200	DFT-S	64QAM	38.69	-

NR Band n261 (Beam ID: 63) Maximum Average EIRP [dBm]				
Channel	BW [MHz]	Waveform	Modulation	Outer Full
Middle	100	DFT-S	QPSK	39.45
	100	CP	QPSK	39.41
	100	DFT-S	BPSK	39.86
	100	DFT-S	16QAM	39.36
	100	DFT-S	64QAM	36.33
Highest	200	DFT-S	QPSK	40.37
	200	CP	QPSK	40.39
	200	DFT-S	BPSK	40.73
	200	DFT-S	16QAM	40.39
	200	DFT-S	64QAM	37.84

NR Band n261 (Beam ID: 319) Maximum Average EIRP [dBm]				
Channel	BW [MHz]	Waveform	Modulation	Outer Full
Lowest	100	DFT-S	QPSK	37.85
	100	CP	QPSK	37.84
	100	DFT-S	BPSK	38.79
	100	DFT-S	16QAM	37.81
	100	DFT-S	64QAM	35.38
Highest	200	DFT-S	QPSK	40.04
	200	CP	QPSK	40.07
	200	DFT-S	BPSK	40.40
	200	DFT-S	16QAM	40.06
	200	DFT-S	64QAM	37.45

NR Band n261 EIRP Worst Case Plot
Highest Channel / 200MHz / BPSK / 64RB0 (Beam ID: 63+319)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 39.4 + 2.65 + 107 + 20log(1.2) – 104.8 = 45.83 (dB)

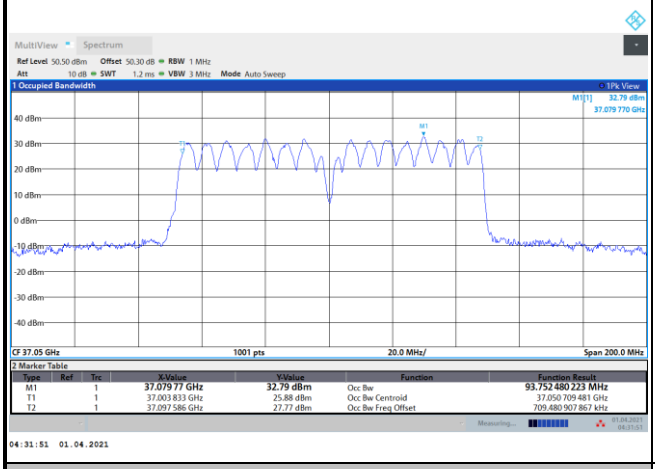
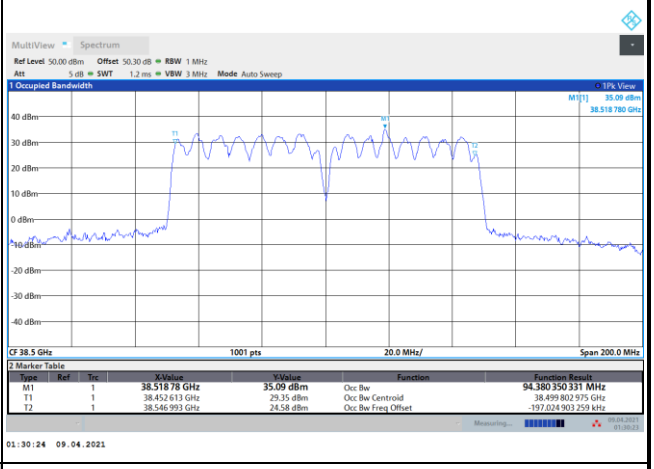
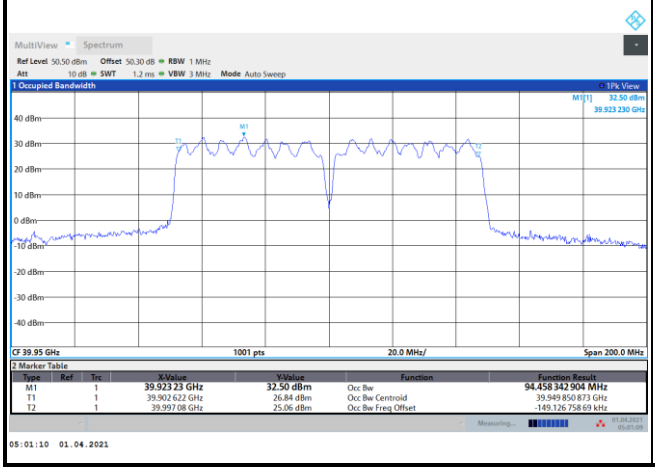
Appendix B.1 Radiated Test: NR Band n260 (Beam ID: 63+319)

Occupied Bandwidth

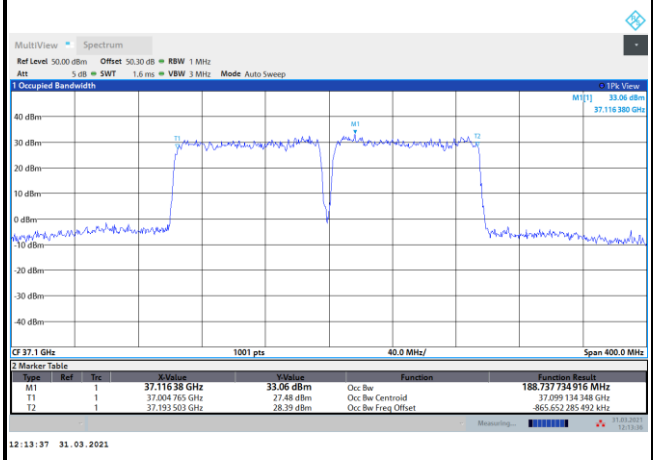
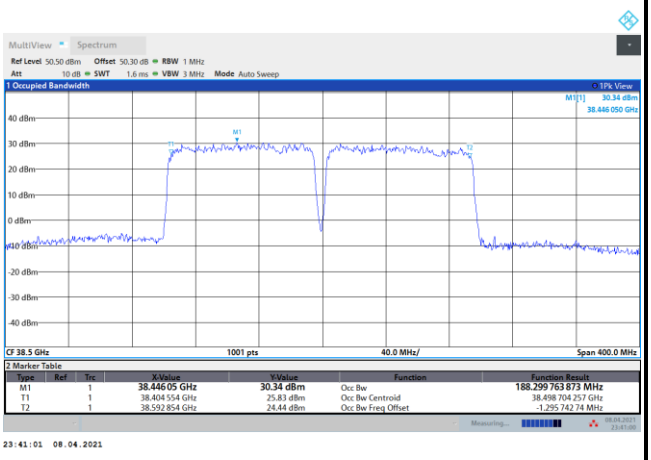
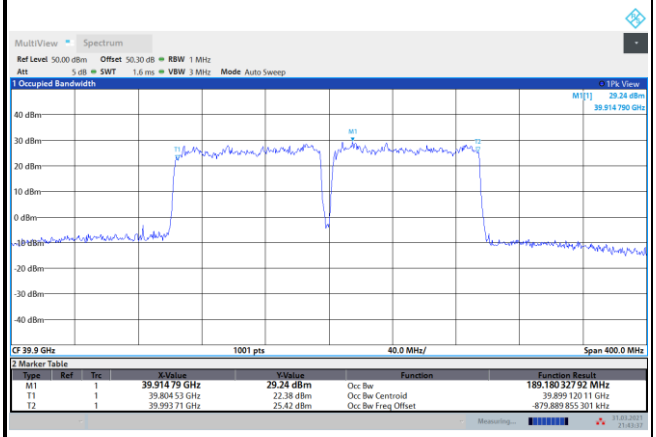
Mode	DFT-s-OFDM NR Band n260 : 99%OBW(MHz)							
BW	100MHz				200MHz			
Mod.	BPSK	QPSK	16QAM	64QAM	BPSK	QPSK	16QAM	64QAM
Lowest CH	93.63	93.75	93.68	93.91	188.71	188.73	189.23	188.80
Middle CH	-	94.38	-	-	-	188.29	-	-
Highest CH	-	94.45	-	-	-	189.18	-	-

Mode	CP-OFDM NR Band n260 : 99%OBW(MHz)					
BW	100MHz			200MHz		
Mod.	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Lowest CH	94.60	94.51	94.33	191.24	191.35	190.75
Middle CH	94.29	-	-	190.26	-	-
Highest CH	94.43	-	-	190.96	-	-

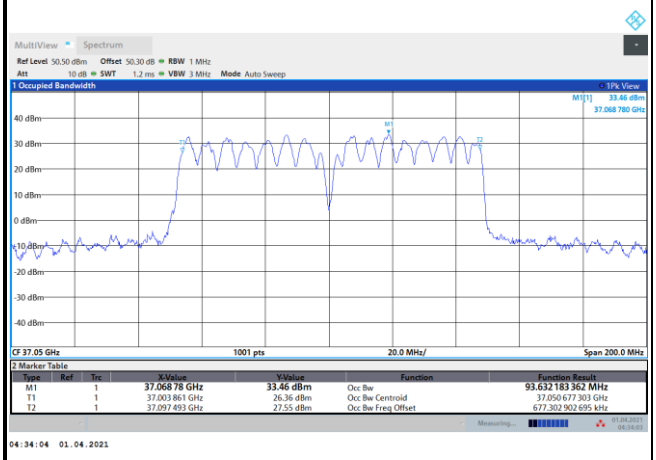
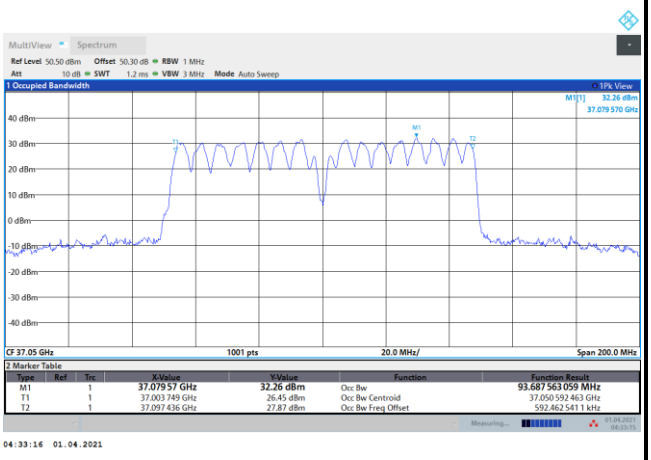
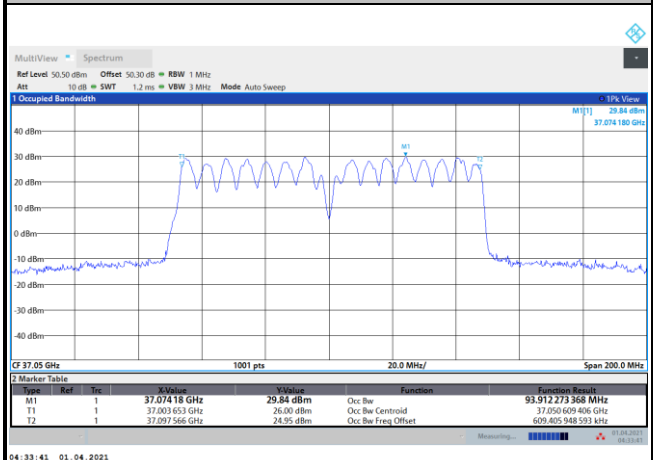
DFT-s-OFDM

NR Band n260	
Lowest Channel / 100MHz / QPSK	**Middle Channel / 100MHz / QPSK**
	
Highest Channel / 100MHz / QPSK	
	

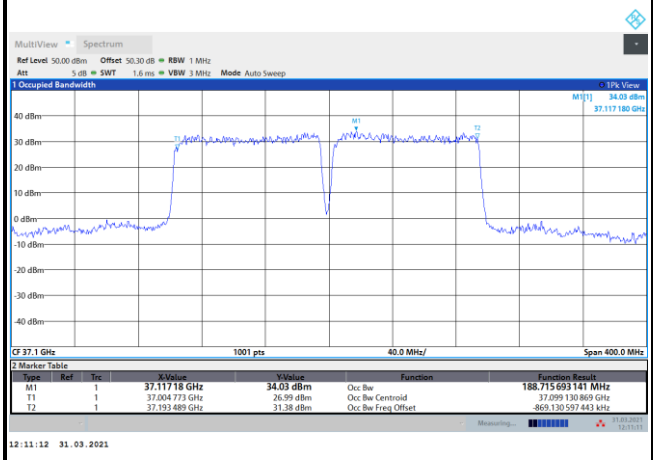
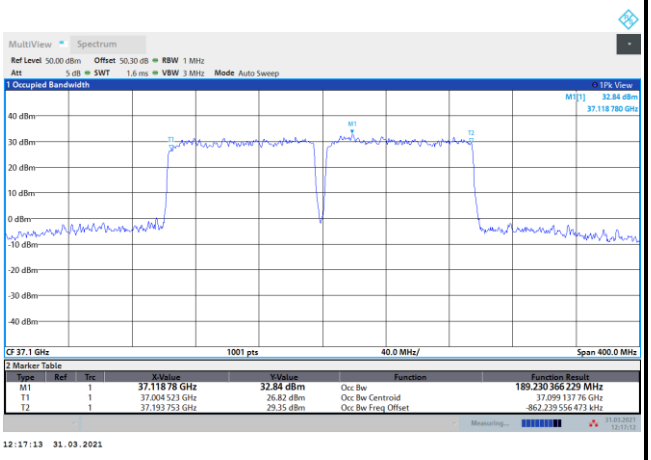
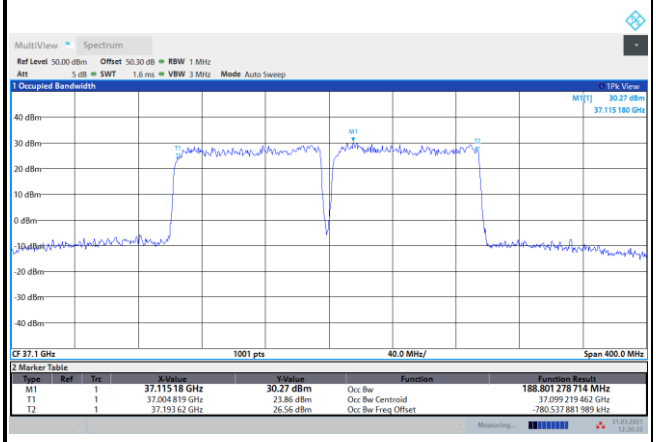
DFT-s-OFDM

NR Band n260	
Lowest Channel / 200MHz / QPSK	**Middle Channel / 200MHz / QPSK**
	
Highest Channel / 200MHz / QPSK	
	

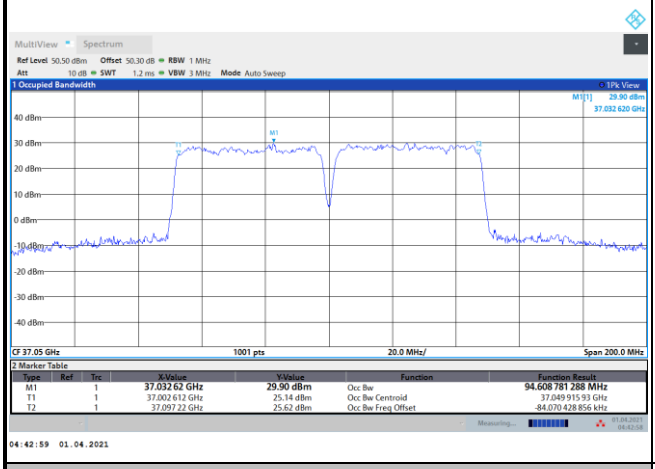
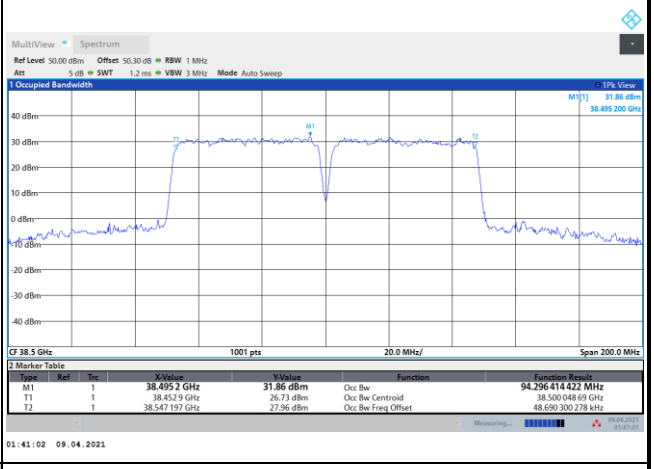
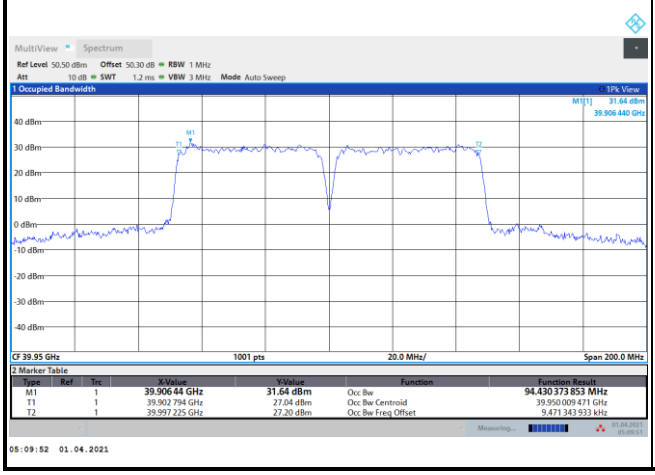
DFT-s-OFDM

NR Band n260	
Lowest Channel / 100MHz / BPSK	**Lowest Channel / 100MHz / 16QAM**
	
Lowest Channel / 100MHz / 64QAM	
	

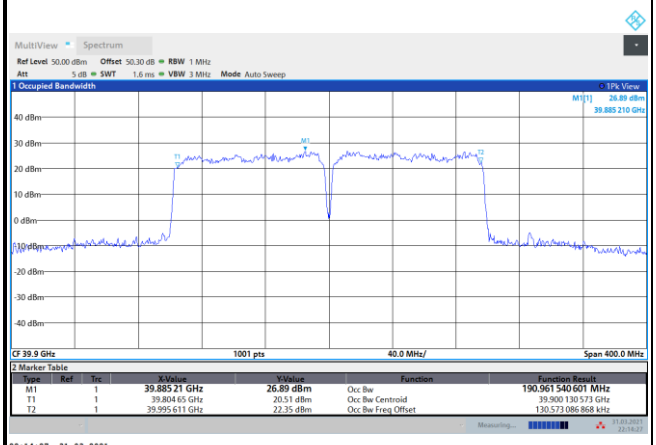
DFT-s-OFDM

NR Band n260	
Lowest Channel / 200MHz / BPSK	**Lowest Channel / 200MHz / 16QAM**
	
Lowest Channel / 200MHz / 64QAM	
	

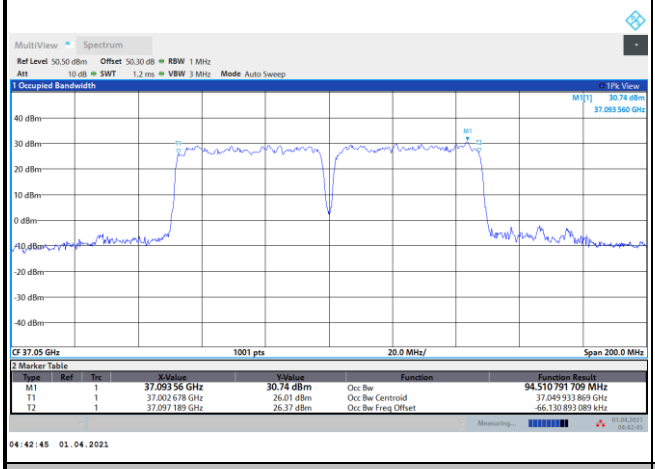
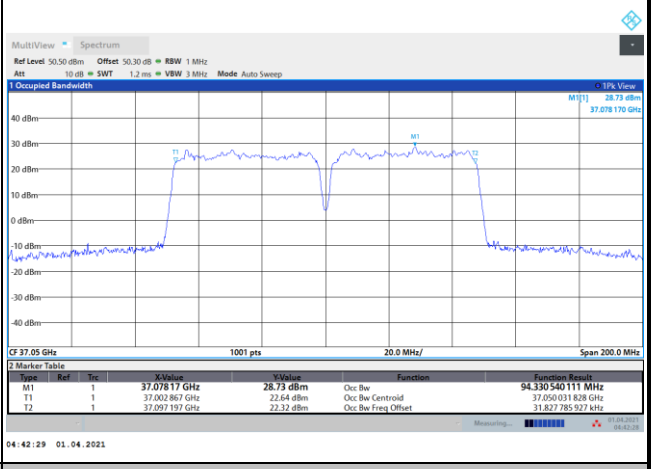
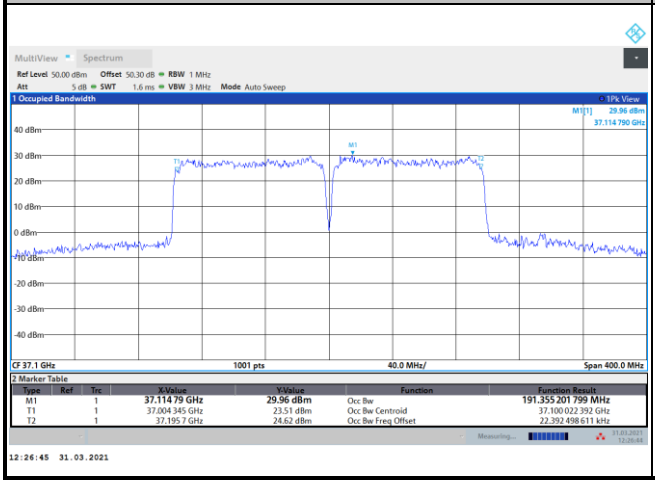
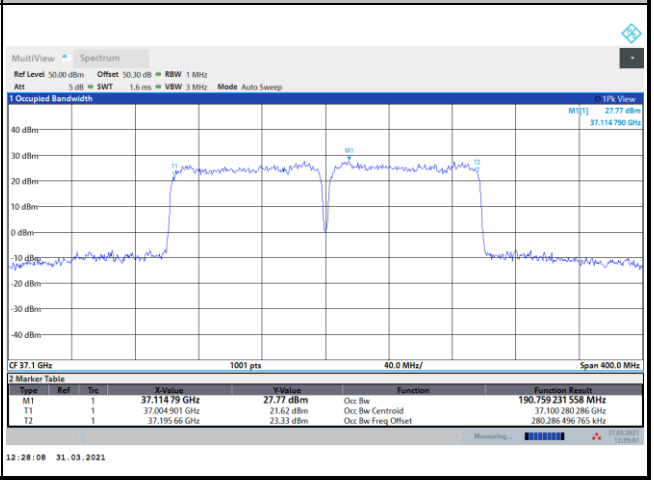
CP-OFDM

NR Band n260	
Lowest Channel / 100MHz / QPSK	**Middle Channel / 100MHz / QPSK**
	
Highest Channel / 100MHz / QPSK	
	

CP-OFDM

NR Band n260	
Lowest Channel / 200MHz / QPSK	**Middle Channel / 200MHz / QPSK**
	
Highest Channel / 200MHz / QPSK	
	

CP-OFDM

NR Band n260	
Lowest Channel / 100MHz / 16QAM	**Lowest Channel / 100MHz / 64QAM**
	
Lowest Channel / 200MHz / 16QAM	**Lowest Channel / 200MHz / 64QAM**
	

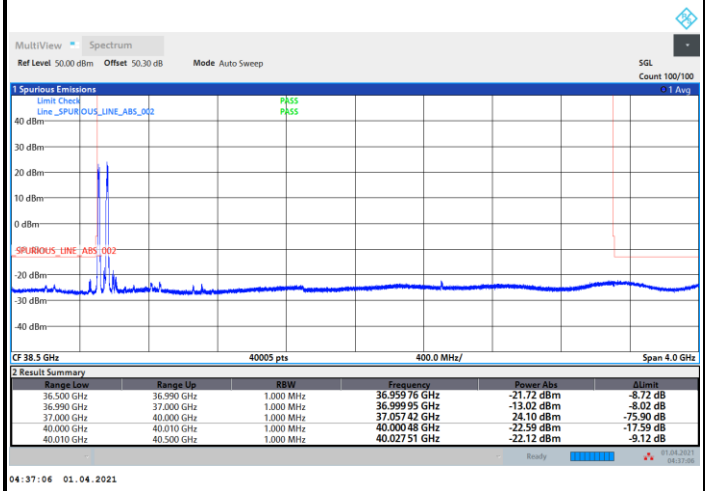
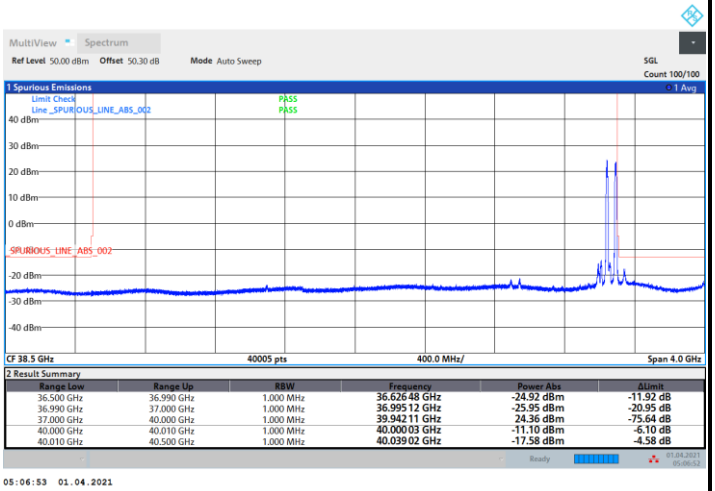
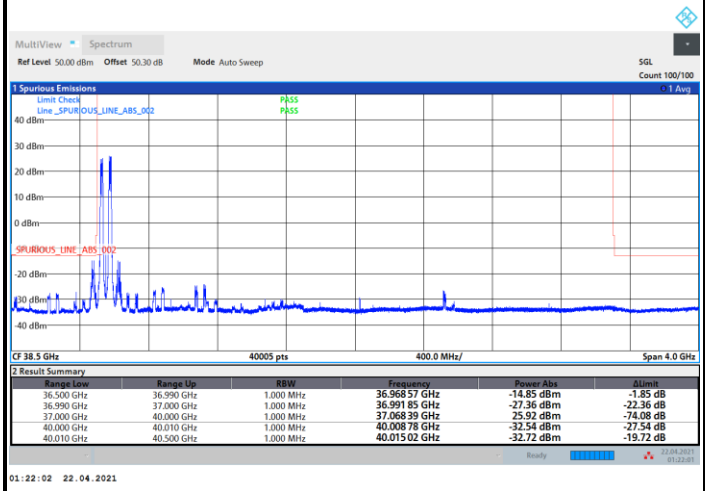
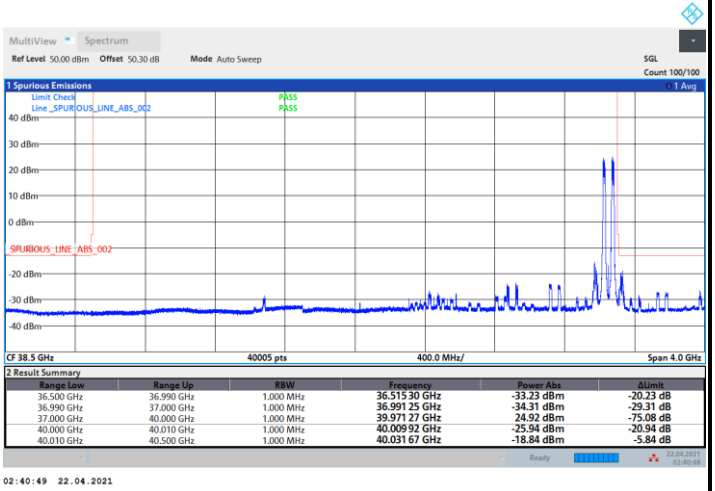
Radiated Out of Band Emissions

Test Result:

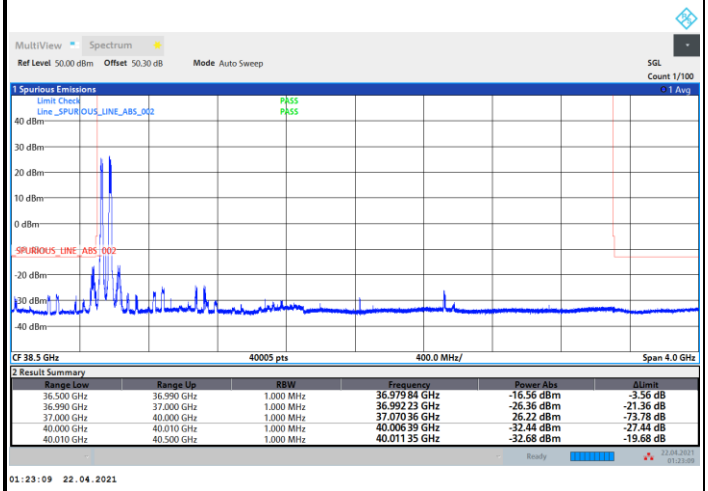
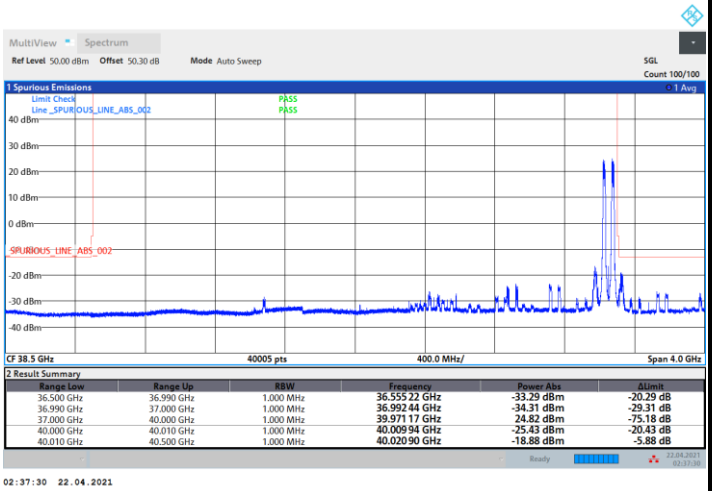
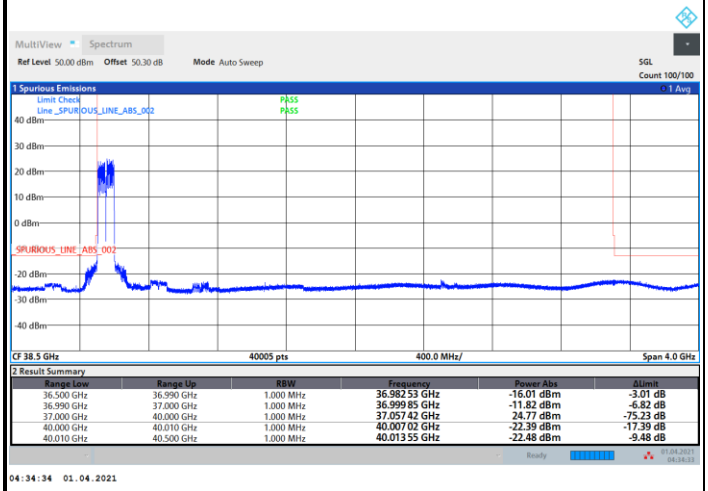
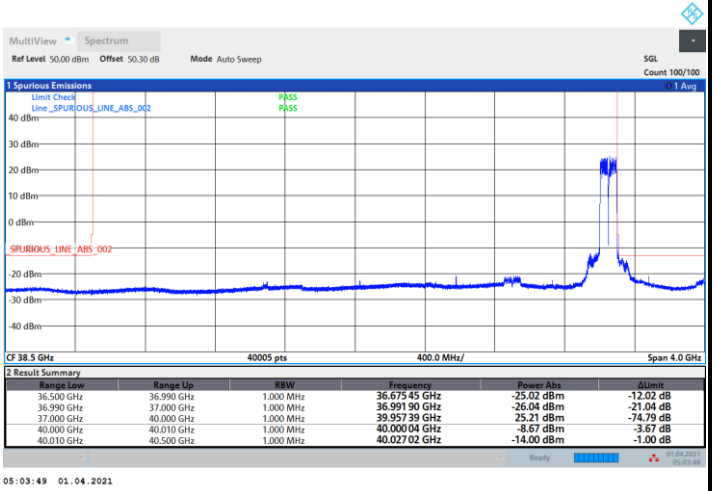
Mode		DFT-s-OFDM NR Band n260							
Channel	BW (MHz)	Modulation	RB Size/ allocation	0 ~ 10 %OB Limit (dBm/MHz)	0 ~ 10 %OB PSD (dBm/MHz)	Result	>10%OB Limit (dBm/MHz)	>10%OB PSD (dBm/MHz)	Result
Low	100	QPSK	32/0	-5	-12.25	Pass	-13	-17.48	Pass
Low	100	BPSK	32/0	-5	-11.82	Pass	-13	-16.01	Pass
Low	100	QPSK	8/0	-5	-13.02	Pass	-13	-21.72	Pass
Low	100	QPSK	10/11	-5	-26.36	Pass	-13	-16.56	Pass
Low	100	BPSK	10/11	-5	-27.36	Pass	-13	-14.85	Pass
High	100	QPSK	32/0	-5	-9.94	Pass	-13	-14.39	Pass
High	100	BPSK	32/0	-5	-8.67	Pass	-13	-14	Pass
High	100	QPSK	8/24	-5	-11.1	Pass	-13	-17.58	Pass
High	100	QPSK	10/11	-5	-25.43	Pass	-13	-18.88	Pass
High	100	BPSK	10/11	-5	-25.94	Pass	-13	-18.84	Pass
Low	200	QPSK	64/0	-5	-23.21	Pass	-13	-21.60	Pass
Low	200	BPSK	64/0	-5	-22.62	Pass	-13	-21.03	Pass
Low	200	QPSK	8/0	-5	-10.99	Pass	-13	-14.02	Pass
Low	200	QPSK	20/22	-5	-28.38	Pass	-13	-17.79	Pass
Low	200	BPSK	20/22	-5	-29.32	Pass	-13	-17.18	Pass
High	200	QPSK	64/0	-5	-14.21	Pass	-13	-14.93	Pass
High	200	BPSK	64/0	-5	-16.25	Pass	-13	-17.26	Pass
High	200	QPSK	8/58	-5	-16.96	Pass	-13	-15.58	Pass
High	200	QPSK	20/22	-5	-29.53	Pass	-13	-25.56	Pass
High	200	BPSK	20/22	-5	-29.76	Pass	-13	-24.19	Pass

Note: Both DFT-s-ODFM and CP-OFDM waveforms are evaluated, and the DFT-s-ODFM is the worst case.

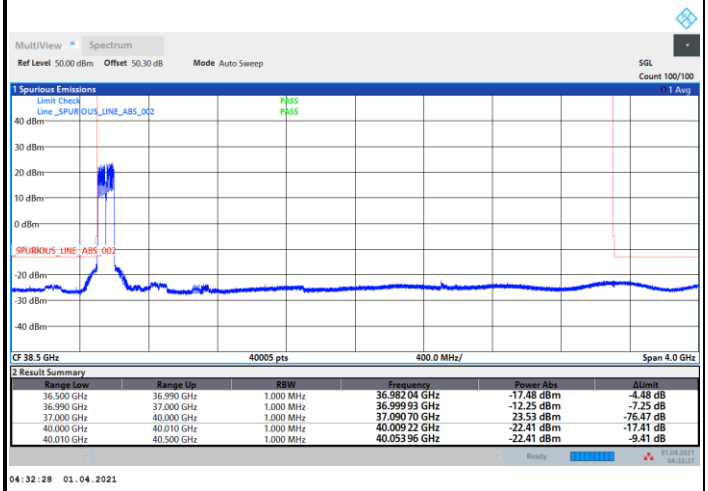
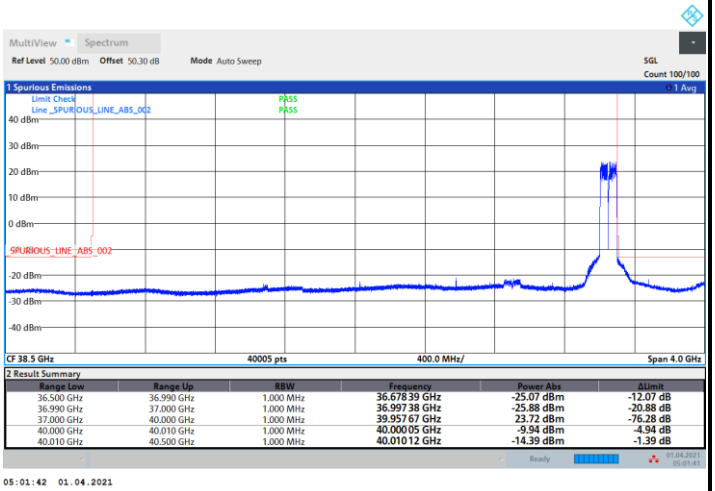
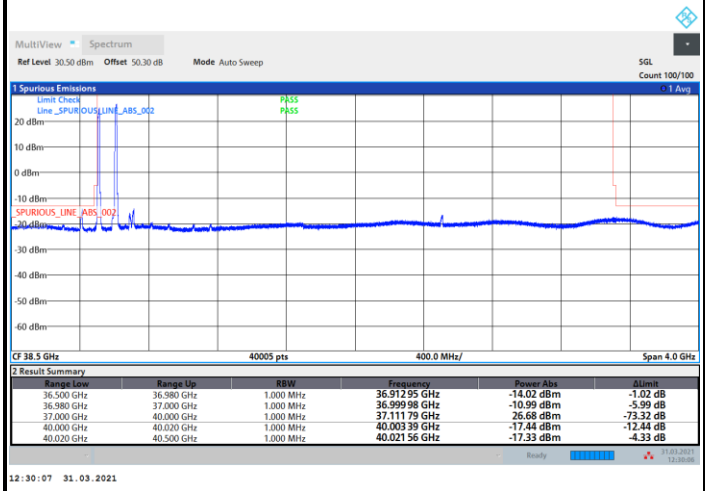
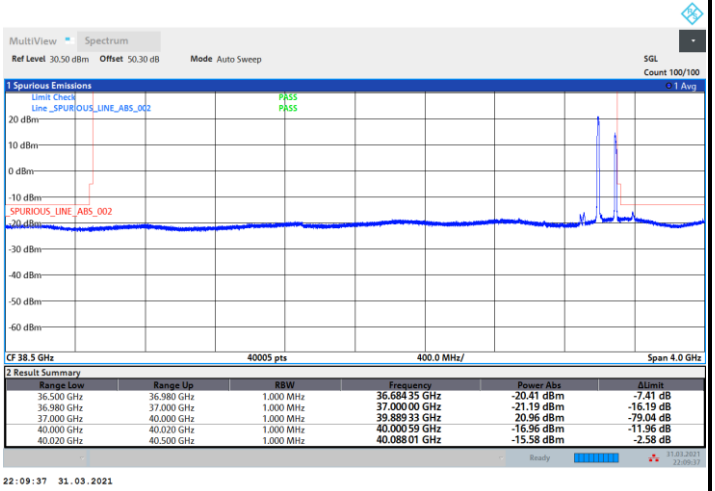
DFT-s-OFDM

NR Band n260 / 100MHz / QPSK	
Lowest Band Edge / 8 RB (8/0)	**Highest Band Edge / 8 RB (8/24)**
	
NR Band n260 / 100MHz / BPSK	
Lowest Band Edge / Full RB (10/11)	**Highest Band Edge / Full RB (10/11)**
	

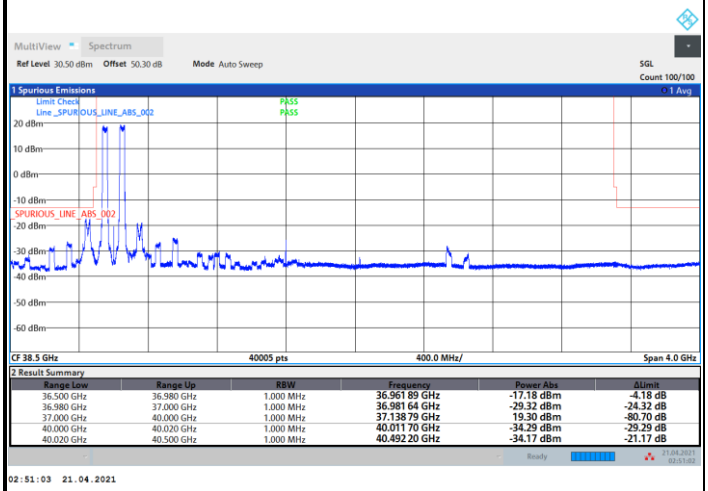
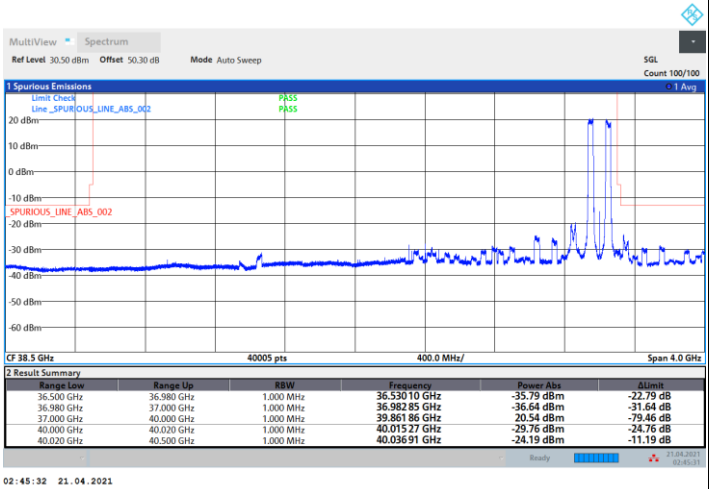
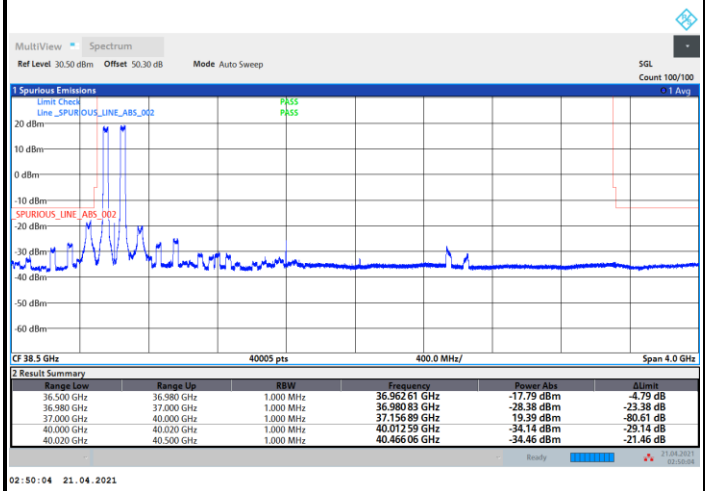
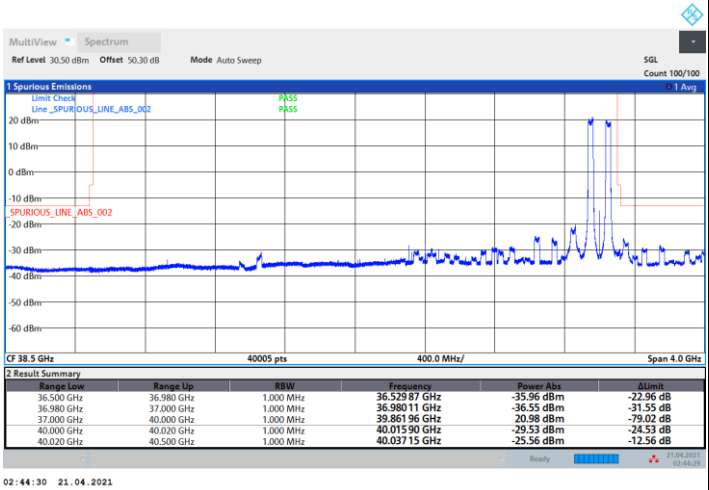
DFT-s-OFDM

NR Band n260 / 100MHz / QPSK	
Lowest Band Edge / Full RB (10/11)	**Highest Band Edge / Full RB (10/11)**
	
NR Band n260 / 100MHz / BPSK	
Lowest Band Edge / Full RB (32/0)	**Highest Band Edge / Full RB (32/0)**
	

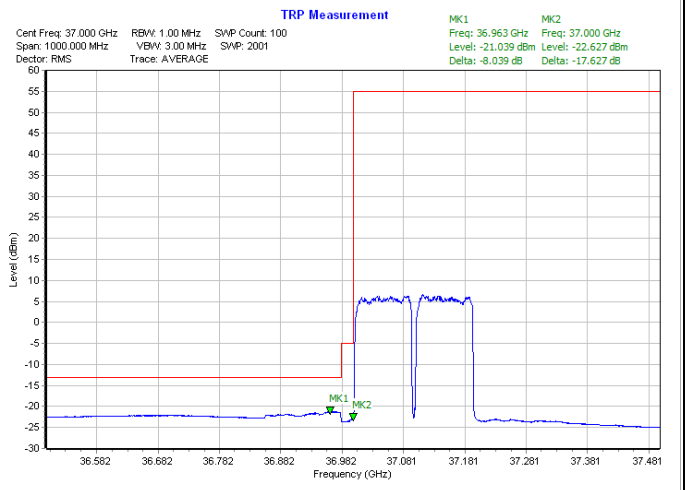
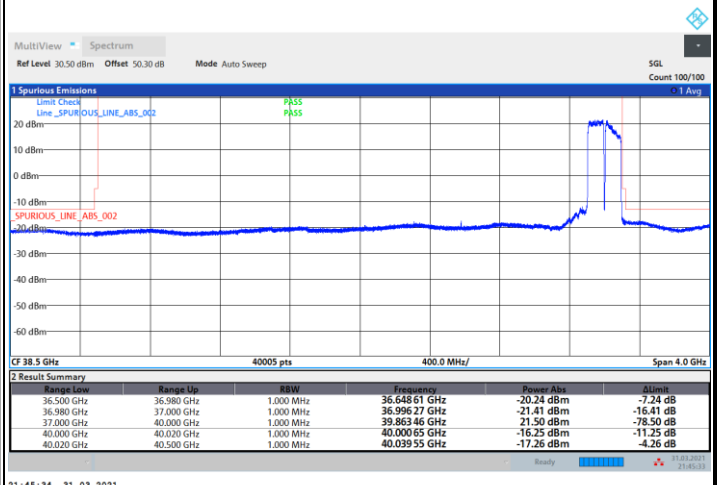
DFT-s-OFDM

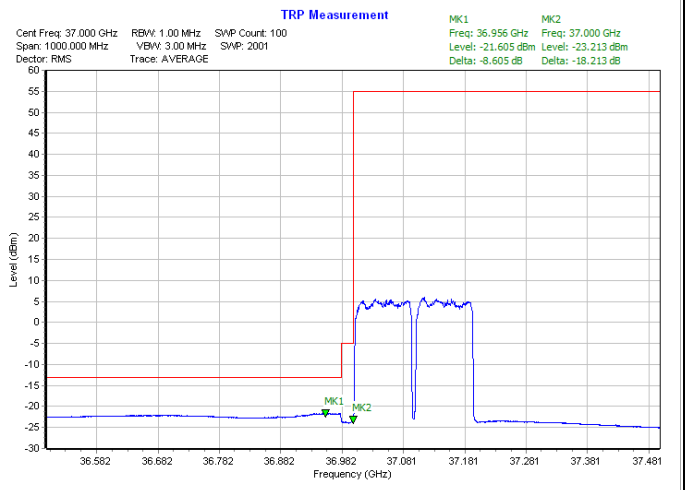
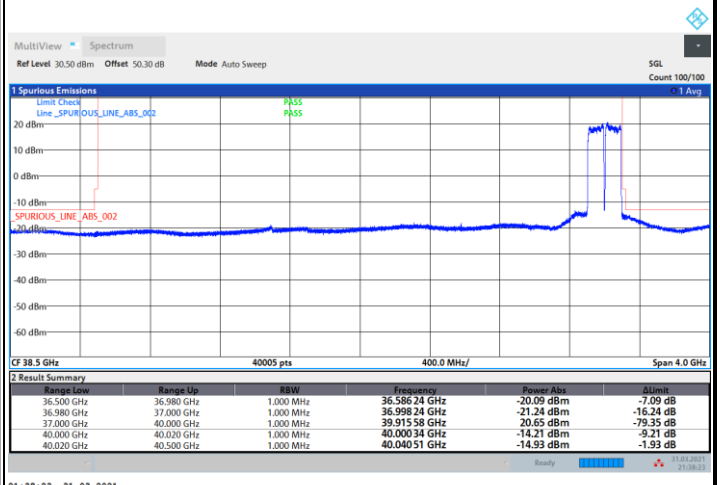
NR Band n260 / 100MHz / QPSK	
Lowest Band Edge / Full RB (32/0)	**Highest Band Edge / Full RB (32/0)**
	
04:32:28 01.04.2021	05:01:42 01.04.2021
NR Band n260 / 200MHz / QPSK	
Lowest Band Edge / 8 RB (8/0)	**Highest Band Edge / 8 RB (8/58)**
	
12:30:07 31.03.2021	22:09:37 31.03.2021

DFT-s-OFDM

NR Band n260 / 200MHz / BPSK	
Lowest Band Edge / Full RB (20/22)	**Highest Band Edge / Full RB (20/22)**
	
NR Band n260 / 200MHz / QPSK	
Lowest Band Edge / Full RB (20/22)	**Highest Band Edge / Full RB (20/22)**
	

DFT-s-OFDM

NR Band n260 / 200MHz / BPSK	
Lowest Band Edge / Full RB (64/0)	**Highest Band Edge / Full RB (64/0)**
	

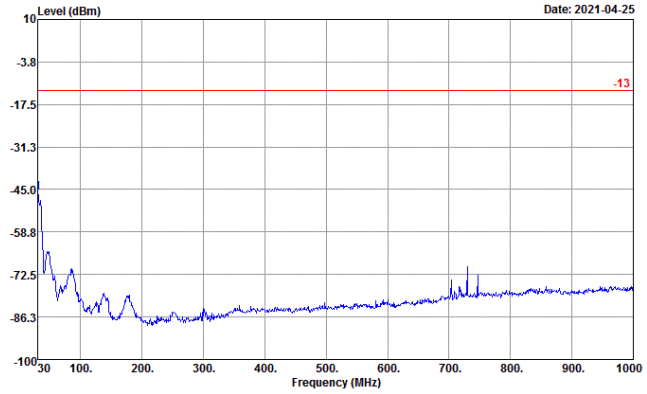
NR Band n260 / 200MHz / QPSK	
Lowest Band Edge / Full RB (64/0)	**Highest Band Edge / Full RB (64/0)**
	

Spurious Emission

There is no significant spurious emission signal found for frequency started from 30MHz up to 18GHz.

Only the noise floor is reported.

NR Band n260 (30MHz-1GHz)
Horizontal

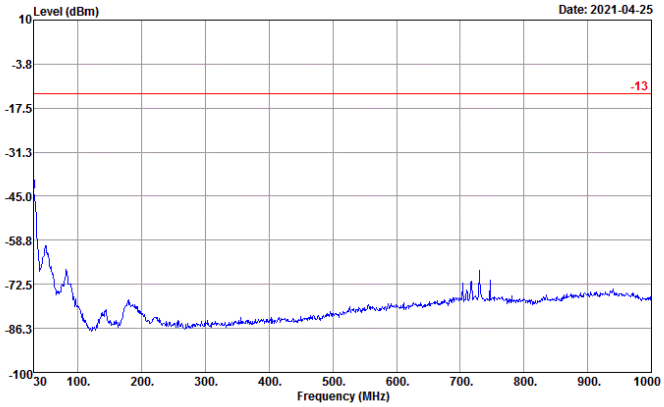


Site : 03CH10-HY
Condition : -13 EIRP_WO HORIZONTAL

: n260 4 Module 2CC

	Freq	Level	Over Limit	Limit Line
	MHz	dBm	dB	dBm
1	30.00	-45.99	-32.99	-13.00

Vertical



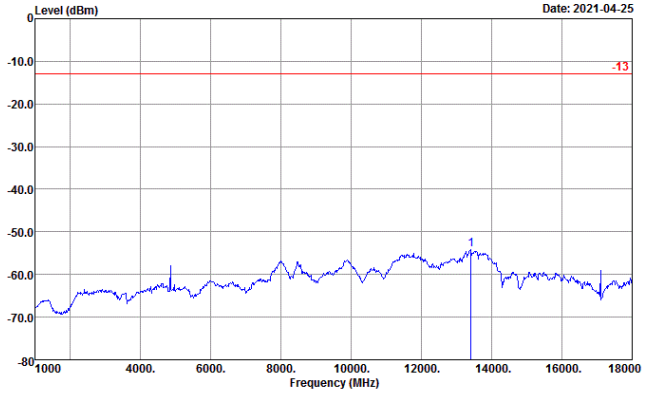
Site : 03CH10-HY
Condition : -13 EIRP_WO VERTICAL

: n260 4 Module 2CC

	Freq	Level	Over Limit	Limit Line
	MHz	dBm	dB	dBm
1	30.00	-43.58	-30.58	-13.00

NR Band n260 (1GHz-18GHz)

Horizontal

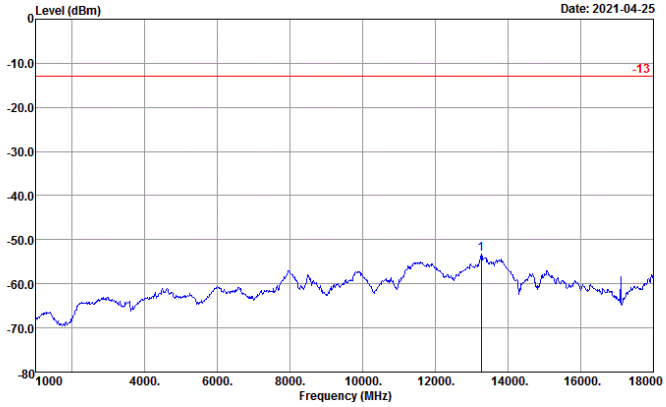


Site : 03CH10-HY
Condition : -13 EIRP_WO HORIZONTAL

: n260 4 Module 2CC

	Freq	Level	Over Limit	Limit Line
	MHz	dBm	dB	dBm
1	13410.00	-54.18	-41.18	-13.00

Vertical



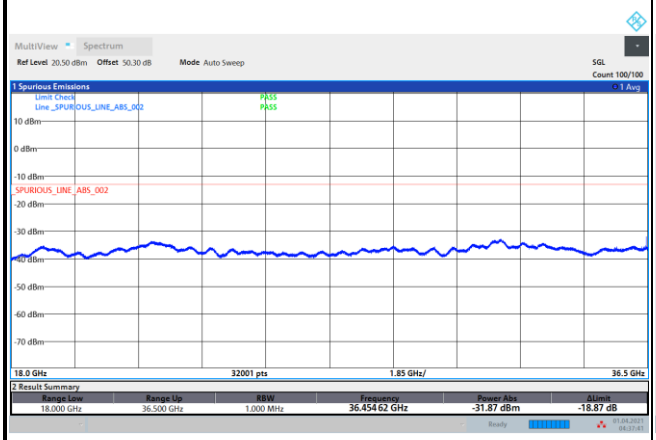
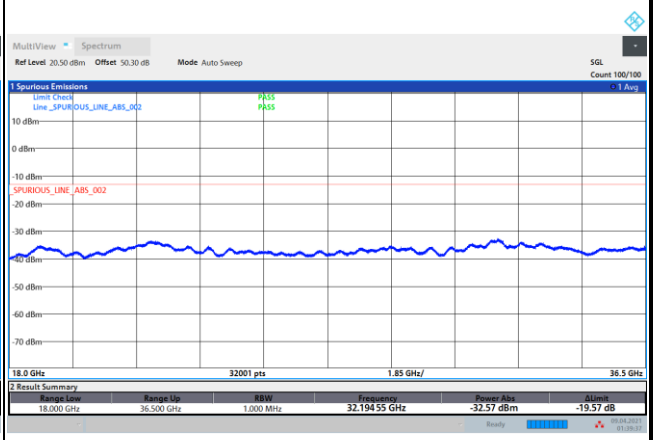
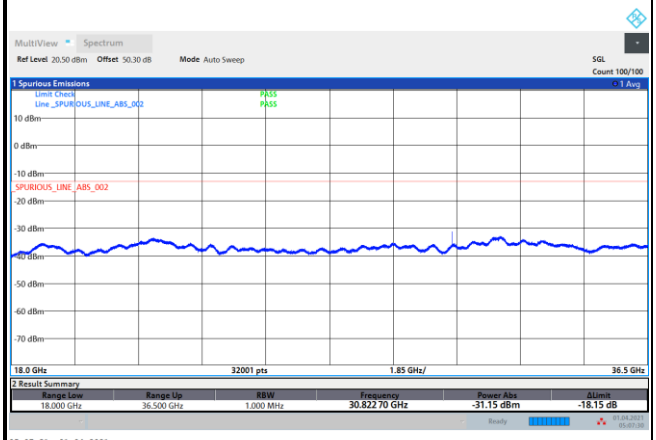
Site : 03CH10-HY
Condition : -13 EIRP_WO VERTICAL

: n260 4 Module 2CC

	Freq	Level	Over Limit	Limit Line
	MHz	dBm	dB	dBm
1	13257.00	-53.34	-40.34	-13.00

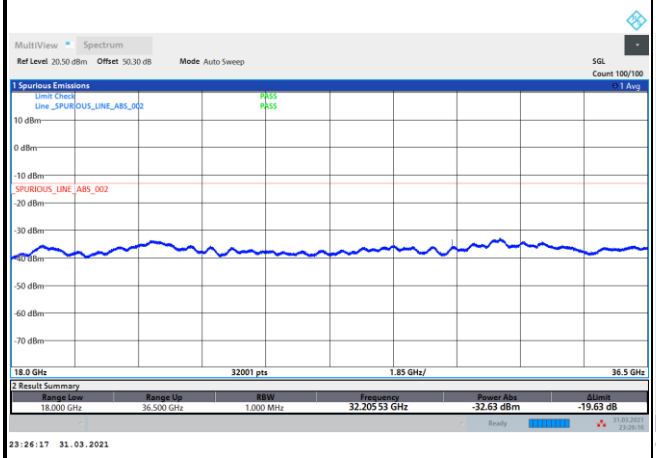
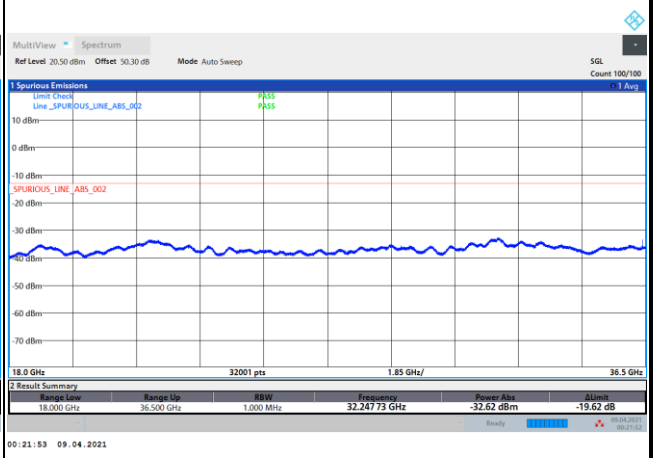
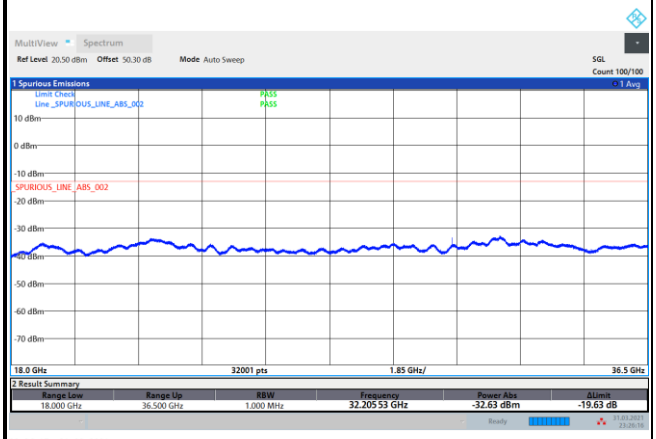
Spurious emission between 18GHz to 40GHz worst case plot is reported as following.

DFT-s-OFDM

NR Band n260 QPSK (18-40GHz)	
Lowest Channel / 100MHz	**Middle Channel / 100MHz**
	
Highest Channel / 100MHz	
	

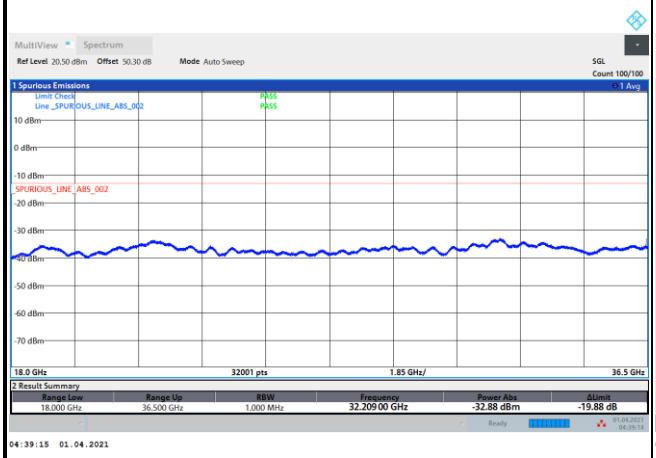
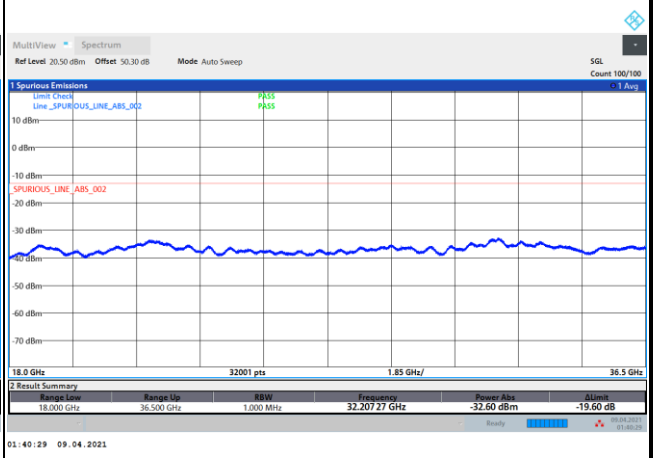
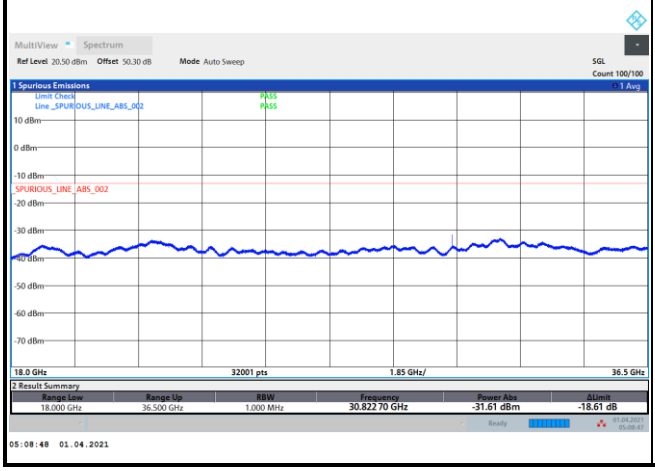
Remark: Above plots, the spurious emissions were measured from 18GHz to 36.5GHz. The test results within the omitted frequency 36.5GHz to 40GHz were measured and reported in the section of Radiated Out of Band Emission with frequency range, 36.5GHz to 40.5GHz and all spurious comply with limits.

DFT-s-OFDM

NR Band n260 QPSK (18-40GHz)	
Lowest Channel / 200MHz	**Middle Channel / 200MHz**
	
Highest Channel / 200MHz	
	

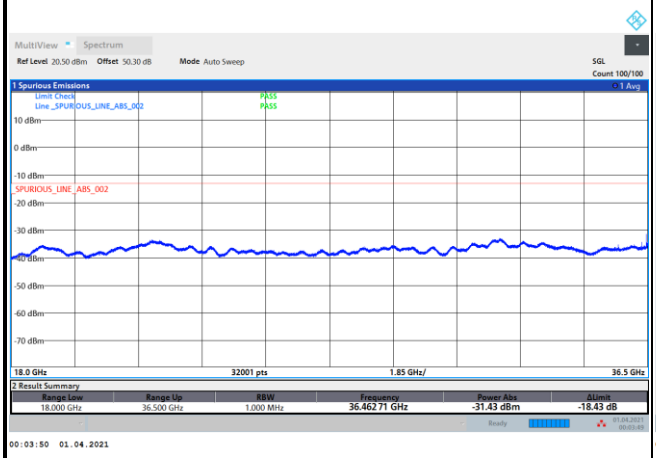
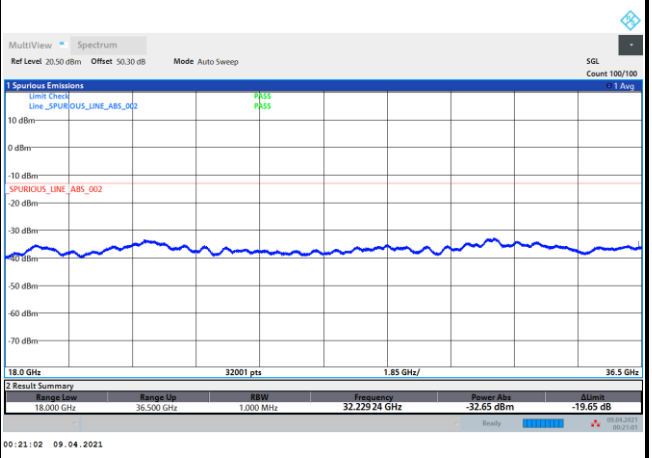
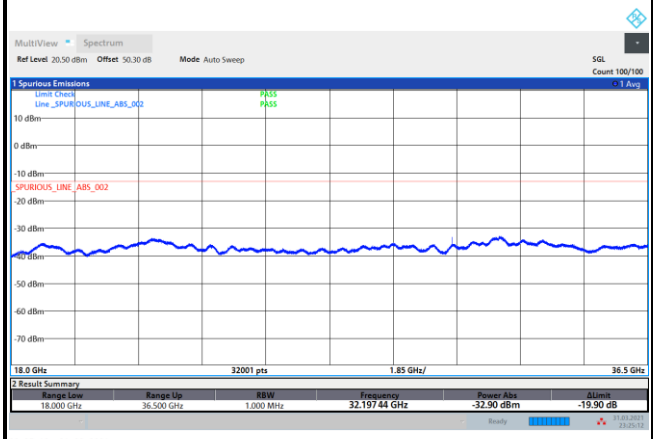
Remark: Above plots, the spurious emissions were measured from 18GHz to 36.5GHz. The test results within the omitted frequency 36.5GHz to 40GHz were measured and reported in the section of Radiated Out of Band Emission with frequency range, 36.5GHz to 40.5GHz and all spurious comply with limits.

CP-OFDM

NR Band n260 QPSK (18-40GHz)	
Lowest Channel / 100MHz	**Middle Channel / 100MHz**
	
Highest Channel / 100MHz	
	

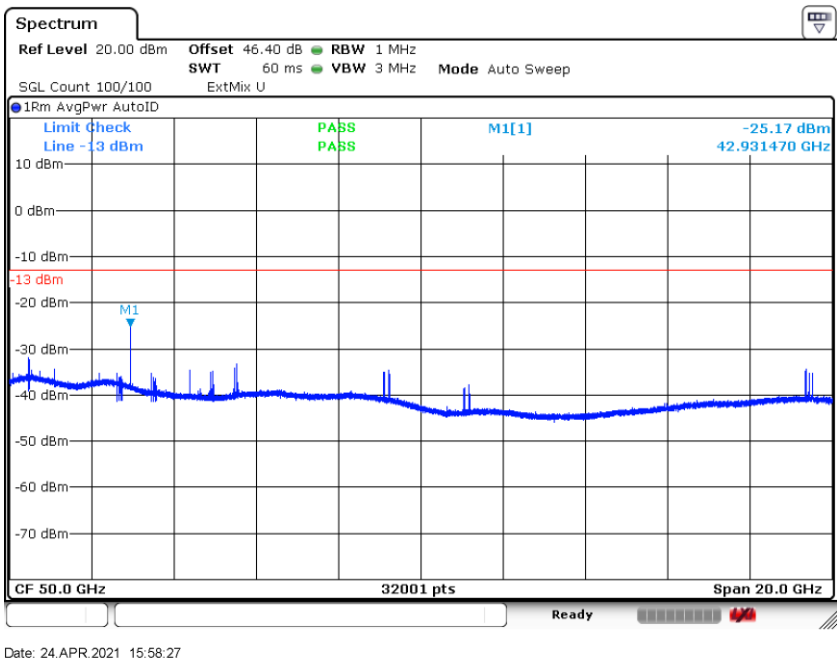
Remark: Above plots, the spurious emissions were measured from 18GHz to 36.5GHz. The test results within the omitted frequency 36.5GHz to 40GHz were measured and reported in the section of Radiated Out of Band Emission with frequency range, 36.5GHz to 40.5GHz and all spurious comply with limits.

CP-OFDM

NR Band n260 QPSK (18-40GHz)	
Lowest Channel / 200MH	**Middle Channel / 200MHz**
	
Highest Channel / 200MHz	
	

Remark: Above plots, the spurious emissions were measured from 18GHz to 36.5GHz. The test results within the omitted frequency 36.5GHz to 40GHz were measured and reported in the section of Radiated Out of Band Emission with frequency range, 36.5GHz to 40.5GHz and all spurious comply with limits.

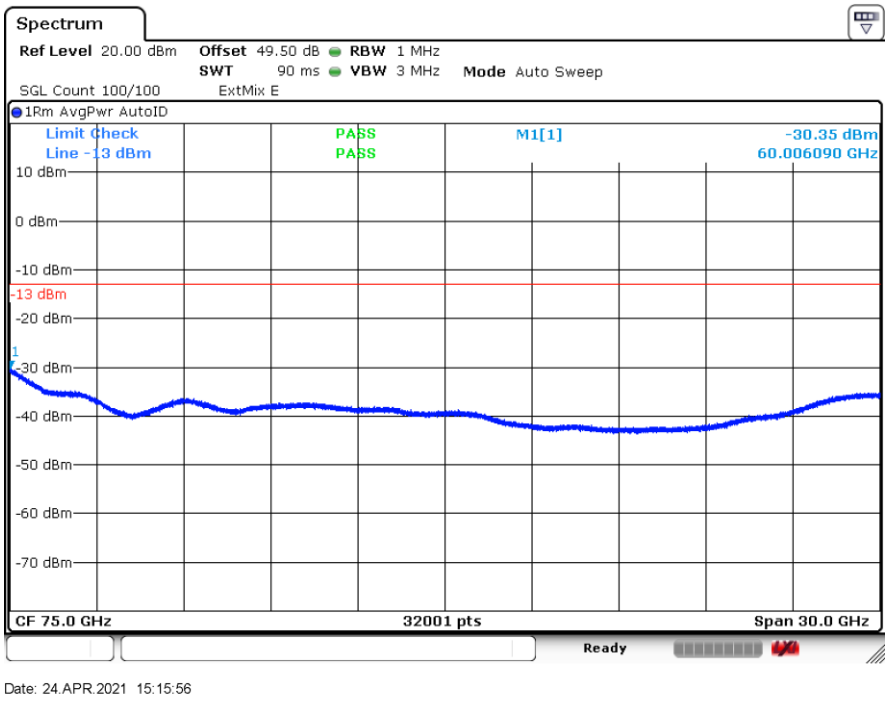
NR Band n260
(40GHz-60GHz)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 42.3 + 0.34 + 107 + 20log(1.2) – 104.8 = 46.4 (dB)

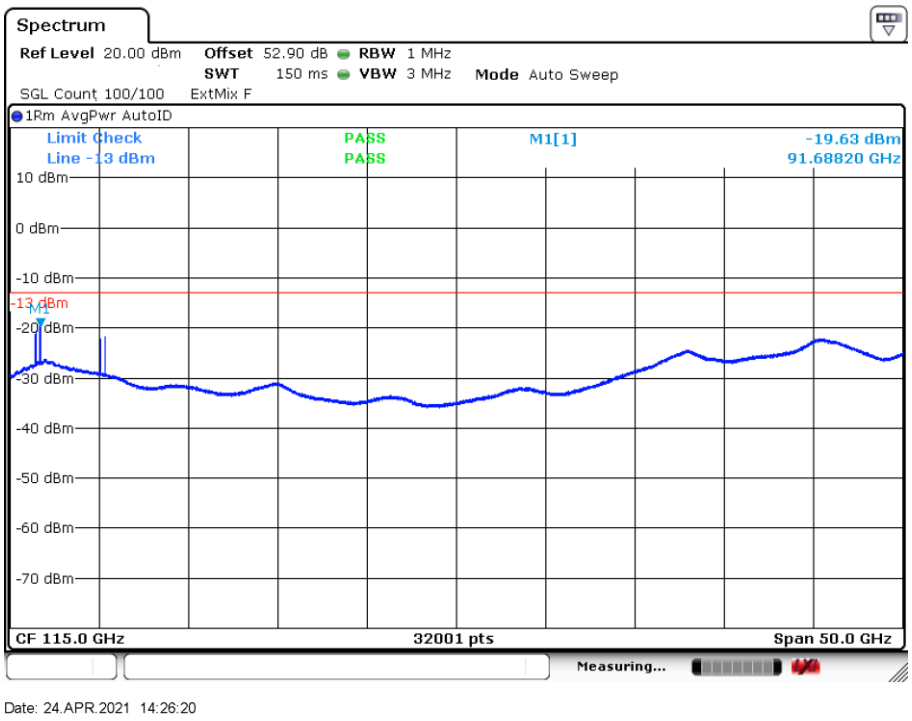
NR Band n260
(60GHz-90GHz)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 45.4 + 0.34 + 107 + 20log(1.2) – 104.8 = 49.5 (dB)

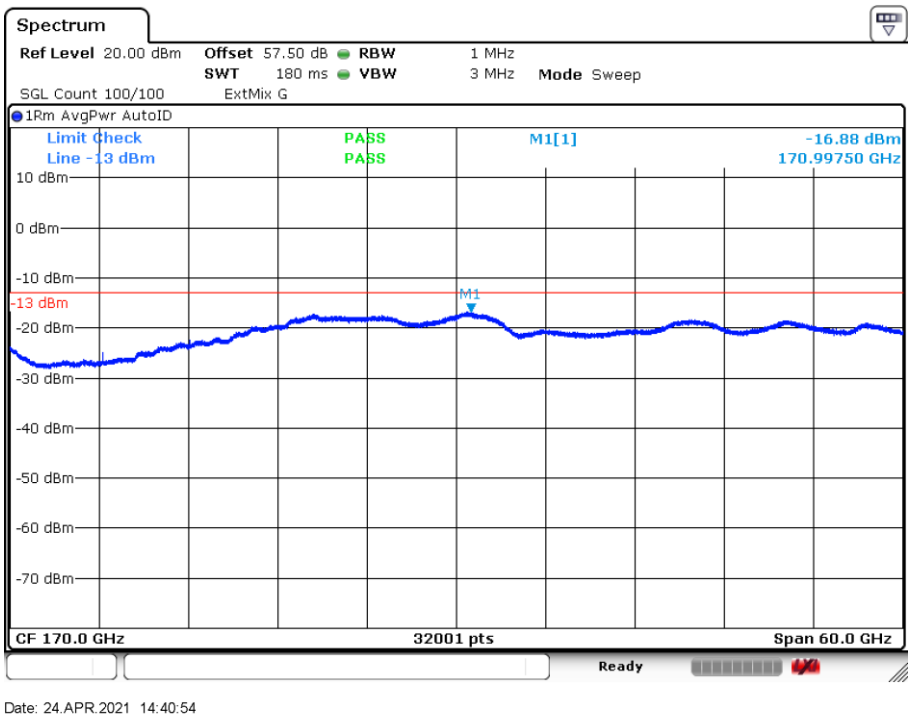
NR Band n260
(90GHz-140GHz)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 48.8 + 0.34 + 107 + 20log(1.2) – 104.8 = 52.9 (dB)

NR Band n260
(140GHz-200GHz)



Offset = Antenna Factor (dB/m) + Cable Loss (dB) + 107 + 20log (D) – 104.8

= 53.4 + 0.34 + 107 + 20log(1.2) – 104.8 = 57.5 (dB)

Frequency Stability

Test Conditions		NR Band n260 / Middle Channel			Limit
Temperature (°C)	Voltage (Volt)	CW tone			Note.
		Frequency (GHz)	Deviation (kHz)	Deviation (ppm)	Result
50	120	38.450045	-45.000	1.169	PASS
40	120	38.450022	-22.000	0.571	
30	120	38.450011	-11.000	0.286	
20(Ref.)	120	38.45	0.000	0.000	
10	120	38.449987	13.000	0.338	
0	120	38.4502937	-293.700	7.629	
-10	120	38.4503137	-313.700	8.148	
-20	120	38.4503187	-318.700	8.278	
-30	120	38.4503027	-302.700	7.862	
20	102	38.450022	-22.000	0.571	
20	120	38.449999	1.000	0.026	
20	138	38.450002	-2.000	0.052	

Note: The frequency fundamental emissions stay within the operation band.

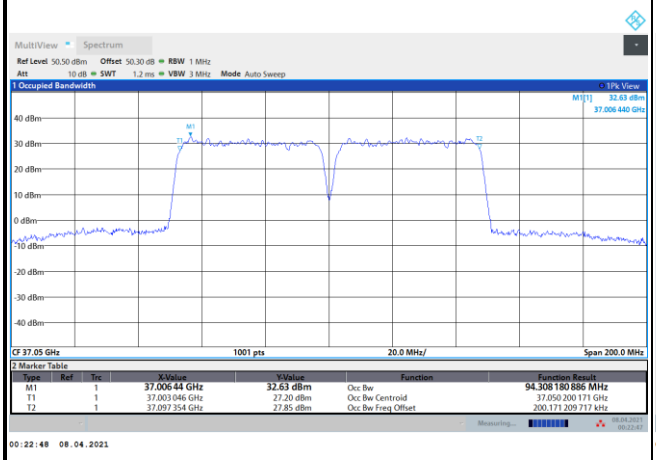
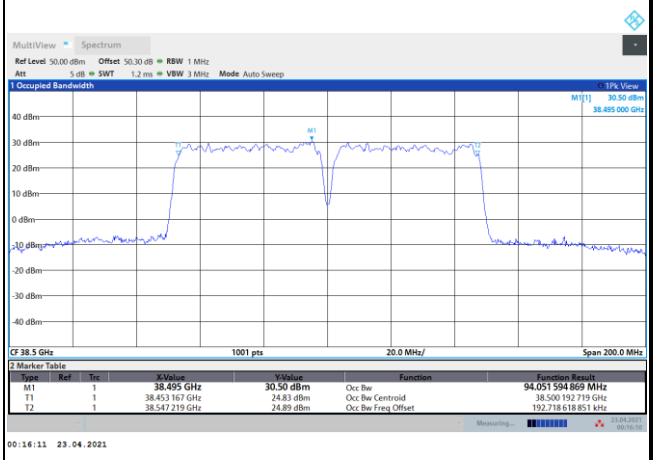
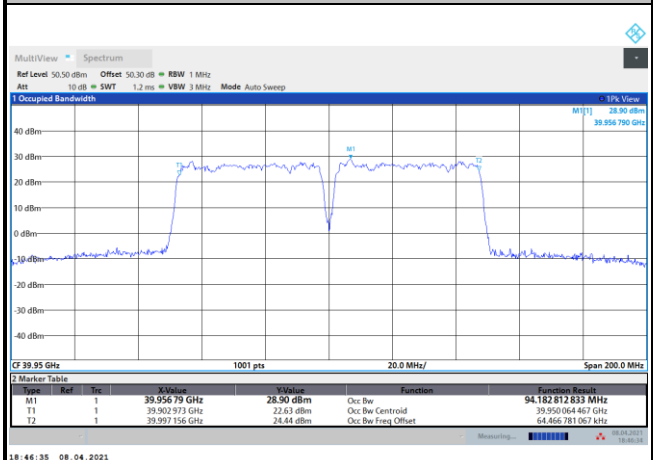
Appendix B.2 Radiated Test: NR Band n260 (Beam ID: 63)

Occupied Bandwidth

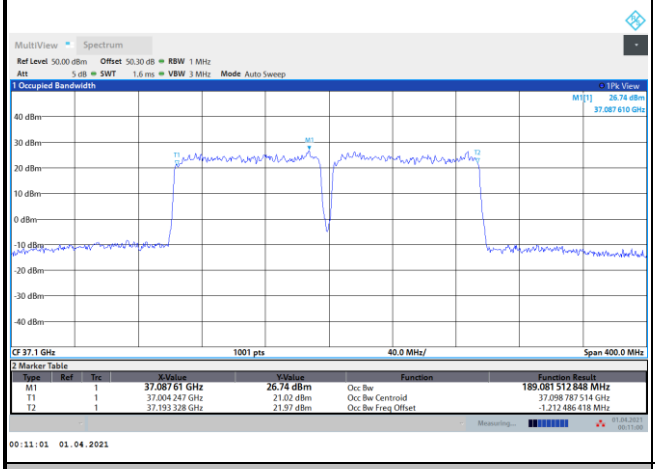
Mode	DFT-s-OFDM NR Band n260 : 99%OBW(MHz)	
BW	100MHz	200MHz
Mod.	QPSK	QPSK
Lowest CH	94.30	189.08
Middle CH	94.05	189.06
Highest CH	94.18	188.58

Mode	CP-OFDM NR Band n260 : 99%OBW(MHz)	
BW	100MHz	200MHz
Mod.	QPSK	QPSK
Lowest CH	94.39	188.60
Middle CH	94.07	188.72
Highest CH	94.03	190.63

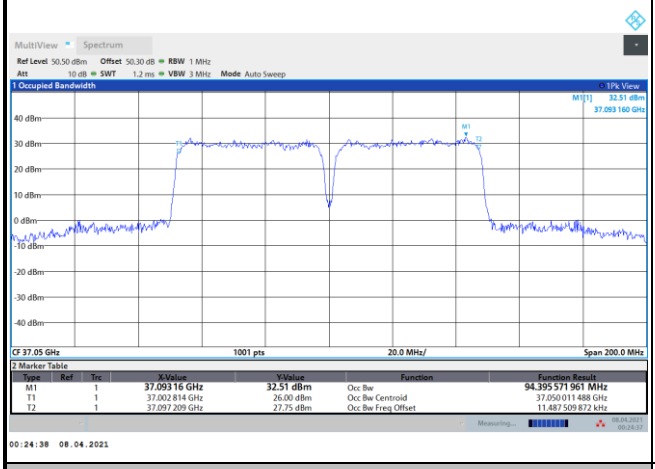
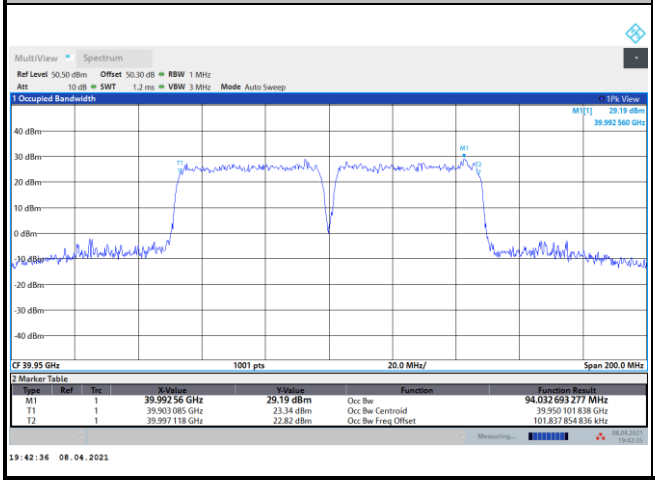
DFT-s-OFDM

NR Band n260	
Lowest Channel / 100MHz / QPSK	**Middle Channel / 100MHz / QPSK**
	
Highest Channel / 100MHz / QPSK	
	

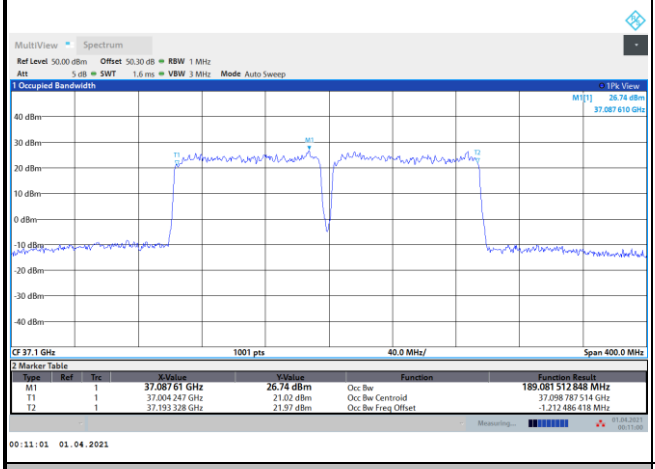
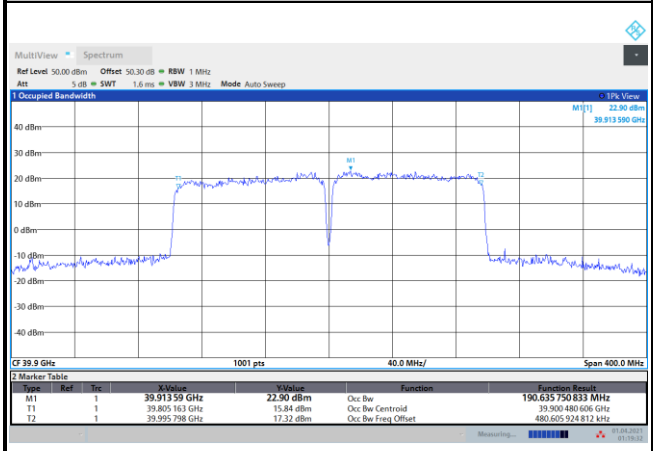
DFT-s-OFDM

NR Band n260	
Lowest Channel / 200MHz / QPSK	**Middle Channel / 200MHz / QPSK**
	
Highest Channel / 200MHz / QPSK	
	

CP-OFDM

NR Band n260	
Lowest Channel / 100MHz / QPSK	**Middle Channel / 100MHz / QPSK**
	
Highest Channel / 100MHz / QPSK	
	

CP-OFDM

NR Band n260	
Lowest Channel / 200MHz / QPSK	**Middle Channel / 200MHz / QPSK**
	
Highest Channel / 200MHz / QPSK	
	

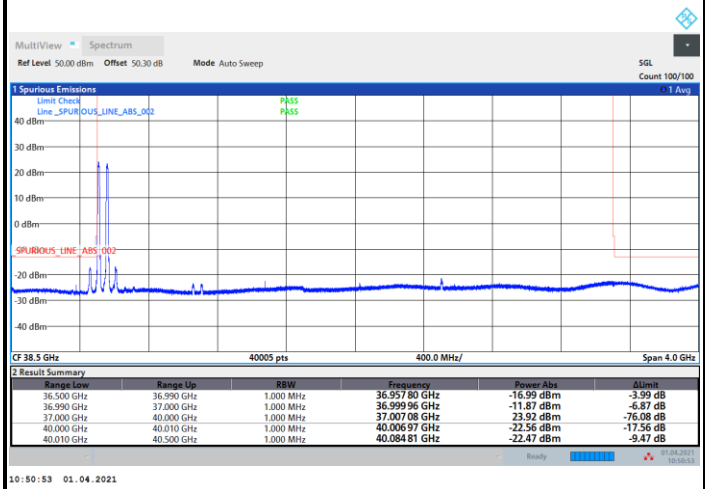
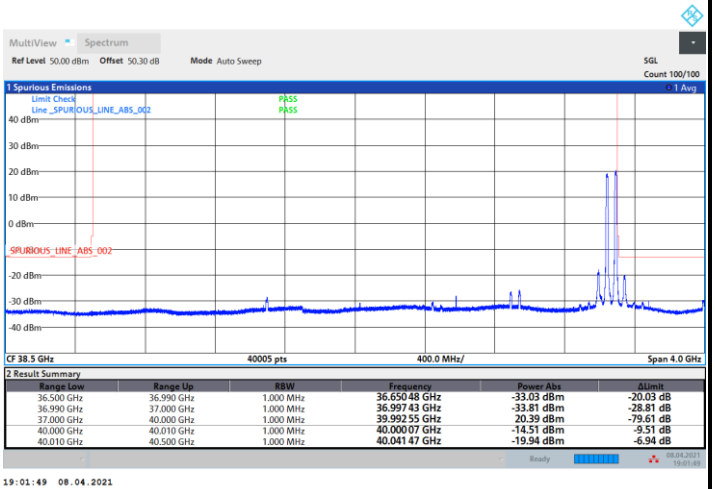
Radiated Out of Band Emissions

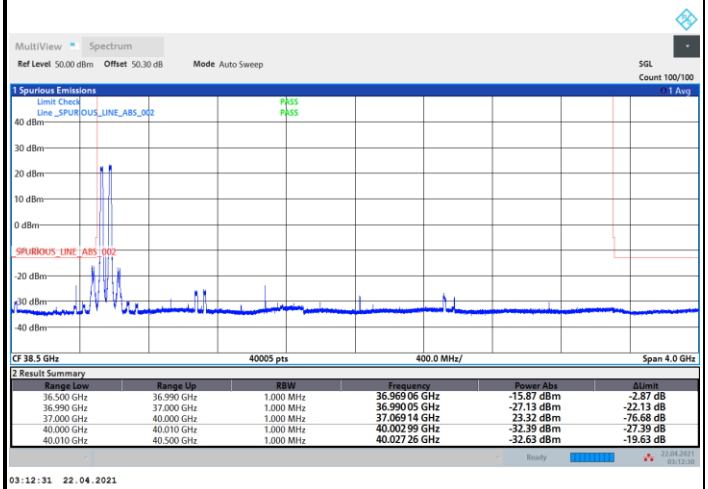
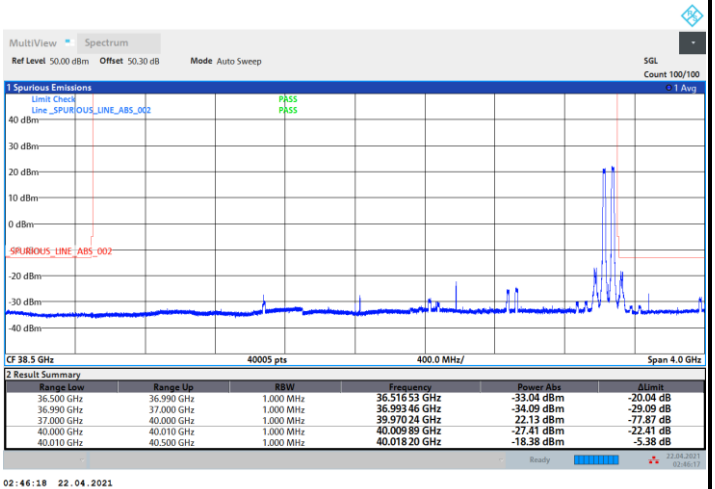
Test Result:

Mode		DFT-s-OFDM NR Band n260							
Channel	BW (MHz)	Modulation	RB Size/ allocation	0 ~ 10 %OB Limit (dBm/MHz)	0 ~ 10 %OB PSD (dBm/MHz)	Result	>10%OB Limit (dBm/MHz)	>10%OB PSD (dBm/MHz)	Result
Low	100	QPSK	32/0	-5	-11.17	Pass	-13	-13.53	Pass
Low	100	BPSK	32/0	-5	-22.84	Pass	-13	-21.65	Pass
Low	100	QPSK	8/0	-5	-11.87	Pass	-13	-16.99	Pass
Low	100	QPSK	10/11	-5	-26.2	Pass	-13	-16.78	Pass
Low	100	BPSK	10/11	-5	-27.13	Pass	-13	-15.87	Pass
High	100	QPSK	32/0	-5	-14.28	Pass	-13	-17.75	Pass
High	100	BPSK	32/0	-5	-14.3	Pass	-13	-17.7	Pass
High	100	QPSK	8/24	-5	-15.61	Pass	-13	-20.36	Pass
High	100	QPSK	10/11	-5	-27.03	Pass	-13	-19.19	Pass
High	100	BPSK	10/11	-5	-27.41	Pass	-13	-18.38	Pass
Low	200	QPSK	64/0	-5	-15.19	Pass	-13	-15.83	Pass
Low	200	BPSK	64/0	-5	-13.45	Pass	-13	-15	Pass
Low	200	QPSK	8/0	-5	-17.08	Pass	-13	-18.37	Pass
Low	200	QPSK	20/22	-5	-28.46	Pass	-13	-18.56	Pass
Low	200	BPSK	20/22	-5	-29.81	Pass	-13	-17.86	Pass
High	200	QPSK	64/0	-5	-16.23	Pass	-13	-16.36	Pass
High	200	BPSK	64/0	-5	-15.41	Pass	-13	-16.41	Pass
High	200	QPSK	8/58	-5	-16.49	Pass	-13	-16.95	Pass
High	200	QPSK	20/22	-5	-29.04	Pass	-13	-21.28	Pass
High	200	BPSK	20/22	-5	-28.69	Pass	-13	-20.52	Pass

Note: Both DFT-s-ODFM and CP-OFDM waveforms are evaluated, and the DFT-s-ODFM is the worst case.

DFT-s-OFDM

NR Band n260 / 100MHz / QPSK	
Lowest Band Edge / 8 RB (8/0)	**Highest Band Edge / 8 RB (8/24)**
	
10:50:53 01.04.2021	19:01:49 08.04.2021

NR Band n260 / 100MHz / BPSK	
Lowest Band Edge / Full RB (10/11)	**Highest Band Edge / Full RB (10/11)**
	
03:12:31 22.04.2021	02:46:18 22.04.2021